

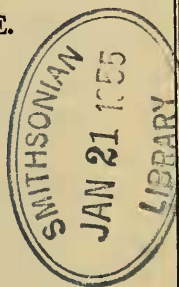
# OPINIONS AND DECLARATIONS RENDERED BY THE INTER- NATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE

*Edited by*

**FRANCIS HEMMING, C.M.G., C.B.E.**

Secretary to the Commission

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## OPINION 312

Validation, under the Plenary Powers, of the name *Amoeba coli* as from Grassi, 1879, to be the name for the large non-dysenteric amoeba of Man and the designation of that species to be the type species of the genus *Entamoeba* Casagrandi & Barbagallo, 1895, and designation under the same powers of the name *Entamoeba histolytica* Schaudinn, 1903, to be the name for the dysenteric amoeba of Man (Class Rhizopoda) (*Opinion* substituted for *Opinion* 99)

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# INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE

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Professor Erich Martin HERING (*Zoologisches Museum der Humboldt-Universität zu Berlin, Germany*) (5th July 1950).

## OPINION 312

VALIDATION, UNDER THE PLENARY POWERS OF THE NAME "AMOEBA COLI" AS FROM GRASSI, 1879, TO BE THE NAME FOR THE LARGE NON-DYSENTERIC AMOEBA OF MAN AND DESIGNATION OF THAT SPECIES TO BE THE TYPE SPECIES OF THE GENUS "ENTAMOEBA" CASAGRANDE & BARBAGALLO, 1895, AND DESIGNATION UNDER THE SAME POWERS OF THE NAME "ENTAMOEBA HISTOLYTICA" SCHAUDINN, 1903, TO BE THE NAME FOR THE DYSENTERIC AMOEBA OF MAN (CLASS RHIZOPODA) ("OPINION" SUBSTITUTED FOR "OPINION" 99)

**RULING** :—(1) The Ruling given in *Opinion* 99 is hereby cancelled as being incorrect and misleading, and that *Opinion* is revoked for all except historical purposes.

(2) The following action is hereby taken under the Plenary Powers :—

- (a) The specific name *coli* L $\ddot{o}$ sch, 1875, as published in the combination *Amoeba coli*, is hereby suppressed for the purposes both of the Law of Priority and of the Law of Homonymy.
- (b) The under-mentioned specific names are hereby suppressed for the purposes of the Law of Priority but not for those of the Law of Homonymy :—
  - (i) *urogenitalis* Baelz, 1883, as published in the combination *Amoeba urogenitalis* ;
  - (ii) *vaginalis* Blanchard, 1885, as published in the combination *Amoeba vaginalis* ;
  - (iii) *intestinalis* Blanchard, 1885, as published in the combination *Amoeba intestinalis* ;
  - (iv) *dysenterica* Pfeiffer, 1888, as published in the combination *Amoeba dysenterica* ;
  - (v) *dysenteriae* Councilman & Lafleur, 1891, as published in the combination *Amoeba dysenteriae* ;

- (c) It is hereby directed that the specific name *histolytica* Schaudinn, 1903, as published in the combination *Entamoeba histolytica*, is to be applied to the dysenteric amoeba of Man described and figured by Dobell (C.C.), 1919, *The Amoebae living in Man* : 31—70, pl. I, figs. 1—6 ; pl. II, fig. 16 ; pl. III ; pl. IV, figs. 70—76.
- (d) It is hereby directed that the binomen *Amoeba coli*, as published by Grassi in 1879, is to be treated as being a scientific name (binominal combination) then published for the first time, and the specific name *coli* Grassi, 1879, so published is hereby validated.
- (e) It is hereby directed that the specific name *coli* Grassi, 1879, as published in the combination *Amoeba coli* and as validated under (d) above, is to be applied to the large non-dysenteric amoeba of Man described and figured by Dobell (C.C.), 1919, *The Amoebae living in Man* : 78—92, pl. I, figs. 12—15 ; pl. II, fig. 17 ; pl. IV, figs. 55—69.
- (f) The nominal species *Amoeba coli* Grassi, 1879, as validated under (d) above and as defined under (e) above, is hereby designated to be the type species of the nominal genus *Entamoeba* Casagrandi & Barbagallo, 1895 (a genus established upon a misidentified type species).
- (g) The nominal species *Amoeba coli* Grassi, 1879, referred to in (f) above is to be accepted as the type species, by original designation, of the genus *Löschia* Chatton & Lalung-Bonnaire, 1912 (a genus established upon a misidentified type species).
- (3) It is hereby ruled that the generic name *Entamoeba* Casagrandi & Barbagallo, 1895, is not a homonym of the name *Endamoeba* Leidy, 1879.

(4) The under-mentioned generic names are hereby placed on the *Official List of Generic Names in Zoology* as Names Nos. 754 and 755 respectively: (a) *Entamoeba Casagrandi* & Barbagallo, 1895 (gender: feminine) (type species, by designation, under the Plenary Powers, under (2)(f) above: *Amoeba coli* Grassi, 1879, as validated and defined, under the Plenary Powers, under (2)(d) and (2)(e) above respectively); (b) *Poneramoeba Lühe*, 1909 (gender: feminine) (type species, by original designation: *Entamoeba histolytica* Schaudinn, 1903, as defined under the Plenary Powers, under (2)(c) above) (for use by those specialists who consider that the type species of this genus is generically distinct from the type species of *Entamoeba Casagrandi* & Barbagallo, 1895).

(5) The generic name *Endamoeba* Leidy, 1879 (gender: feminine) (type species, by monotypy: *Amoeba blattae* Bütschli, 1878), placed on the *Official List of Generic Names in Zoology* under the Ruling given in *Opinion 95*, is hereby confirmed in its position on the said *Official List*.

(6) The under-mentioned generic name is hereby placed on the *Official Index of Rejected and Invalid Generic Names in Zoology* as Name No. 159: *Löschia* Chatton & Lalung-Bonnaire, 1912 (a junior objective synonym of *Entamoeba Casagrandi* & Barbagallo, 1895, consequent upon the designation, under the Plenary Powers, under (2)(g) above, of *Amoeba coli* Grassi, 1879, to be the type species of the nominal genus so named).

(7) The under-mentioned specific names are hereby placed on the *Official List of Specific Names in Zoology* as Name Nos. 176 to 178 respectively: (a) *blattae* Bütschli, 1878, as published in the combination *Amoeba blattae* (specific name of type species of *Endamoeba* Leidy, 1879); (b) *coli* Grassi, 1879, as published in the combination *Amoeba coli*, as validated and defined, under the Plenary Powers, under (2)(d) and (2)(e) respectively (specific name of type species, by designation, under the Plenary Powers, under (2)(f) above, of *Entamoeba*

Casagrandi & Barbagallo, 1895) ; (c) *histolytica* Schaudinn, 1903, as published in the combination *Entamoeba histolytica* and as defined, under the Plenary Powers, under (2)(c) above (specific name of type species of *Poneramoeba* Lühe, 1909).

(8) The under-mentioned specific names are hereby placed on the *Official Index of Rejected and Invalid Specific Names in Zoology* as Name Nos. 80 to 85 respectively : (a) *coli* Lösch, 1875, as published in the combination *Amoeba coli*, as suppressed, under the Plenary Powers, under (2)(a) above ; (b) the five specific names specified in (2)(b) above, as there suppressed under the Plenary Powers.

## I.—THE STATEMENT OF THE CASE

The problem involved in connection with the status of the generic name *Entamoeba Casagrandi* & Barbagallo, 1895 (Class Rhizopoda) and of the names to be used for the large non-dysenteric amoeba of Man was laid before the International Commission in three documents which together constituted a co-ordinated whole. The first of these documents was a paper submitted to the Commission on 17th January 1945 by Professor Harold Kirby (*University of California, Department of Zoology, Berkeley, California, U.S.A.*). It was not possible for the Commission at that time to arrange for the early publication of this paper in the *Bulletin of Zoological Nomenclature*, and it was accordingly agreed between the Secretary to the Commission and Professor Kirby that he should pursue his previous plan for the publication of this paper in the United States, without prejudice to the right of the Commission to re-publish it at a later date in the *Bulletin* as part of the documentation of this application to the Commission<sup>1</sup>. Professor Kirby's paper was accordingly published in the *Journal of Parasitology* in June 1945 (Kirby, 1945, *J. Parasit.* 31 (3) : 177—184). Professor Kirby, at the request of the Secretary, inserted in his paper a footnote in which he invited interested specialists to communicate their views on the problem there discussed to the Secretariat of the Commission for the information of the Members of the Commission when that body came to review—as it was clearly necessary that it should—the Ruling in regard to the name *Entamoeba* given in *Opinion* 99 (1928, *Smithson. misc. Coll.* 73 (No. 5) : 4—8). Professor Kirby's paper was not written in the form of an application to the Commission and accordingly did not contain definite proposals for the solution of the problems involved, being concerned only to expose certain defects both in the factual presentation of the problem given in *Opinion* 99 and in the Ruling

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<sup>1</sup> For an account of the arrangement made later for the publication of Professor Kirby's paper see paragraph 10 of the present *Opinion*.

embodied in that *Opinion*. Professor Kirby's paper was as follows :—

“ *Entamoeba coli* ” versus “ *Endamoeba coli* ”

By HAROLD KIRBY

(*Department of Zoology, University of California, Berkeley, California, U.S.A.*)

1. In drawing up the argument for *Opinion* 99 of the International Commission on Zoological Nomenclature, Stiles showed a wish to reject the name *Entamoeba* in the interest of clear distinction. He wrote : “ It seems obvious that unless the name *Entamoeba* is definitely suppressed both the nomenclatorial and the taxonomic status of the species which come into consideration will become even more confused ”. The result of his reasoning was rejection of the name, but the benefits that he hoped for have not been realised. There have been some who in following the *Opinion* have been influenced to take a position regarding the taxonomic status of the amoebae that is not in accord with clear distinction, because unless they took that position the necessary large nomenclatorial departure from the usage that is very widespread in the literature of medical zoology would indeed result in confusion. Retention of the two names *Endamoeba* and *Entamoeba* would permit a clear-cut taxonomic differentiation to be made at the same time that a minimum of departure from customary usage is necessitated. Therefore it seems to me that *Opinion* 99 has actually increased the difficulty that Stiles wished to avoid. I agree with Dobell (1938) that the *Opinion* in its present form should not be regarded as decisive.

2. The equivocal interpretation that some authors have made of *Opinion* 99 is illustrated by Craig's criticism (1944) of Kudo's retention of the name *Entamoeba* : “ It would have been much better had he followed the ruling of the International Committee of Zoological Nomenclature and used the spelling recommended by it as preferable, *i.e.*, ‘ *Endamoeba* ’ ”. Kudo took the position that the species *coli* should not be put into the same genus as the species *blattae*, and his failure to follow *Opinion* 99 made it possible for him to choose *Entamoeba* as the generic name for *coli*. It is not a question of alternative spelling of the name of the genus : the *Opinion* does not constitute an approval of the spelling *Endamoeba* as against *Entamoeba*. There is no choice of orthography : *Endamoeba* is correct and has priority as the name of the genus typified by *E. blattae* ; all amoebae in that genus are called *Endamoeba*, and those not in that genus cannot be called *Endamoeba*.

3. The *Opinion* was published in 1928, and so far as I know, between that time and this only two names have been used in connection with



the species *coli*, *histolytica* and *gingivalis* : *Endamoeba* by those who put the three amoebae into the same genus as *blattae*, and *Entamoeba* by those who do not. The authors in the former group do not accept the generic distinction ; whether or not they follow *Opinion* 99 does not properly enter into their adoption of *Endamoeba*. The authors in the latter group do recognise the generic distinction, and do not follow the *Opinion*. If there should be a third group of authors, who recognise generic distinction among these endozoic amoebae, and accept *Opinion* 99, it would be necessary for them to write *Poneramoeba histolytica*, *Poneramoeba coli*, and *Poneramoeba gingivalis*.

4. The following chronological summary of the history of this matter sets forth the important facts that need to be considered :—

1879. Leidy (1879a, p. 300) introduced the generic name *Endamoeba*, with the one species *Endamoeba blattae*, named *Amoeba blattae* by Bütschli in 1878. The same proposal was printed on 2nd December in Leidy, 1879b, p. 205.

1895. Casagrandi and Barbagallo introduced the generic name *Entamoeba*, giving as the included species *Amoeba coli* (Lösch) and *Amoeba blattarum* (Bütschli). They were ignorant of Leidy's name.

1897. Casagrandi and Barbagallo (p. 163) again printed the name *Entamoeba*, giving as the included species *Entamoeba hominis* and *Entamoeba blattarum*.

1903. Schaudinn, using the generic name *Entamoeba* C. & B., divided *Amoeba coli* of Lösch into two species, *Entamoeba coli* Lösch and *Entamoeba histolytica* n. sp. He did not mention the species *blattae*, and probably was ignorant of Leidy's name.

1910. Chatton assigned various endozoic amoeba to the genus "*Entamoeba* Leidy (1879)". Among the included species were : *Entamoeba coli* (Lösch) 1875, emend. Schaudinn (1903) ; *E. blattae* (Bütschli) 1878 ; *E. ranarum* (Grassi) 1881 ; *E. histolytica* Schaudinn 1903. Chatton stated that the paternity of *Entamoeba* had been wrongly attributed by authors to Casagrandi and Barbagallo. He made no reference to the fact that Leidy's name was actually *Endamoeba*.

1912. Séance du 14 février, mémoire paru le 5 mars (acc. to Chatton, 1912). Chatton and Lalung-Bonnaire write (p. 142) : " La dénomination non latine d'Entamibes appliquée aux amibes normalement parasites du tube digestif est d'un usage commode qui la fera conserver. Mais traduite en nom générique latin, elle ne peut plus s'appliquer actuellement aux amibes du tube digestif des Vertèbrés. Ce n'est pas, en effet, à ces dernières qu'elle a été appliquée en premier lieu. C'est Leidy qui a créé le genre *Entamoeba* pour l'amibe de la Blatte, et ce n'est qu'en 1897 que Casagrandi et Barbagallo l'ont appliquée aux amibes intestinales des Vertèbrés". The authors

considered that the amoebae of vertebrates must be put in a separate separate genus, for which they proposed the name *Löschia*, to contain *coli* Lösch and other species.

1912. Séance du 26 mars. Chatton reported again the generic differentiation of endozoic amoebae made in the above paper. He definitely designated *Löschia coli* Lösch, cysts 8 nuclei or more, as type of the genus *Löschia*. Remarking that protistologists had wrongly attributed the paternity of the genus *Entamoeba* to Casagrandi and Barbagallo, 1897, he wrote (p. 111): "Ces derniers avaient bien appliqué le nom d'*Entamoeba* à une Entamibe humaine, mais Leidy l'avait donné des 1879 à l'*Amoeba blattae* de Bütschli". In a footnote to this statement he noted that Leidy's spelling was "*Endamoeba*", but dismissed that name as an orthographic variant.

1913. Brumpt wrote of the amoebae of Man under the name "*Entamoeba* Leidy, 1879", making the same mistake for *Endamoeba* that Chatton as well as Alexieff (1912) had previously made. In a footnote (p. 21) he wrote: "Ce même genre a été créé de nouveau en 1897 par Casagrandi et Barbagallo pour leur *E. hominis*, synonyme de *E. coli*". That sentence has been accepted by Stiles and Boeck (1923, p. 122), Stiles and Hassall (1925, p. 8), and Stiles (1928 in *Opinion* 99) as a designation of the type *E. coli* (as *E. hominis*) for *Entamoeba* Casagrandi & Barbagallo. (In the third edition, 1922, Brumpt made the same error of "*Entamoeba* Leidy"; but in the next one, 1927, he used *Entamoeba* C. & B. and noted that *Endamoeba* Leidy should be reserved, in agreement with Wenyon, 1926, for the amoeba of the roach.)

1919. Dobell used *Endamoeba* Leidy, 1879, for *E. blattae* only, and *Entamoeba* Casagrandi & Barbagallo, 1895, for *E. coli*, *E. histolytica*, and *E. gingivalis*.

1923. Stiles and Boeck, in a study of the nomenclatorial status of the protozoa of Man (p. 125), considered the genus *Endamoeba* Leidy, 1879, with two sub-genera: *Endamoeba* Leidy, 1879 (type by monotypy *E. blattae*) and *Poneramoeba* Lühe, 1909 (type by monotypy and original designation *E. histolytica*). They stated (p. 124) that "*Entamoeba* 1895 is not available because of *Endamoeba* 1879"; evidently that is because they thought of *Entamoeba* as a homonym, or orthographic variant, because here they dealt with a separate taxonomic category (the sub-genus) from *Endamoeba*. The type of *Endamoeba* 1895 is given (p. 122, 124) as *E. hominis* tsd.=*coli* and *coli* (s. *hominis*); type by subsequent designation is by Brumpt, 1913.

1925. Stiles and Hassall, in the "Key-Catalogue of the Protozoa Reported for Man", list (p. 8) *Entamoeba* C. & B., 1895, type by subsequent designation *hominis*=*coli*, as a subjective synonym of *Endamoeba* Leidy, 1879. It appears from the definition of subjective synonym by Stiles and Boeck, 1923, that it is a category providing for

cases where the identity in question is not absolute, but depends on "the experience and judgment of the reviser" (p. 138). Since in the key-catalogue the types of *Entamoeba* and *Endamoeba* are given as different, although those two types are treated as members of the same genus, it is likely that the reference is to the difference of opinion about generic assignment. Otherwise *Entamoeba* would simply have been designated as a homonym; that category is dealt with in the same paper. Reference to *Entamoeba* as a synonym is, therefore, evidently on the basis that its type, *Ent. coli*, belongs in the same genus as *End. blattae*, according to Stiles and Hassall.

1928. The International Commission on Zoological Nomenclature published *Opinion* 99 in response to an inquiry as to whether the names *Endamoeba* and *Entamoeba* should be considered homonyms. The summary of the *Opinion* reads: "*Entamoeba* 1895, with *blattae* as type by subsequent (1912) designation, is absolute synonym of *Endamoeba* Leidy, 1879a, p. 300 type *blattae*, and invalidates *Entamoeba* 1895, type by subsequent (1913) designation *hominis=coli*". The report also contained the decision that *Entamoeba* is a homonym of ("philologically the same as") *Endamoeba*. It is presumably on that basis that the Secretary recommended that "the name *Entamoeba* 1895, either with type *hominis=coli* as definitely designated by Brumpt, 1913, pl. 21, or with *blattae* as accepted by Chatton and Lalung (1912, 111) and as implied by Chatton (1910, 282), be definitely invalidated by *Endamoeba* Leidy, 1879a, p. 300, type *blattae*, irrespective of the point whether the type of *Entamoeba* be considered *blattae* or *coli*". (The reference to Chatton and Lalung, 1912, p. 111, is evidently a mistake for Chatton and Lalung-Bonnaire, 1912, p. 142, or for Chatton, 1912, p. 111.)

5. It is evident from this summary that Stiles (1928) was justified in his statement that "the case has already produced considerable confusion in literature". It is also evident, however, that this confusion need not have existed if authors had simply been attentive to the correct forms. Then *Endamoeba* Leidy would have been used for any generic concept including the species *blattae*; and *Entamoeba* C. & B. would either have been rejected, or used solely for any generic concept omitting *blattae* and including *coli*. The errors made by earlier authors should not influence us in an effort to reach a solution of the problem.

6. The answer to the taxonomic problem is subject to differences of opinion. Many authors follow the usage of Stiles and Boeck, 1923, in writing *Endamoeba coli*; that usage has been almost universal in American compilations in medical zoology since it was adopted in 1926 by Craig (who in 1911 used *Entamoeba* Casagrandi and Barbagallo without reference to the genus *Endamoeba* Leidy). American writers who recognise generic distinction between *blattae* and *coli* include Kudo (1939, 1944), Wenrich (*Entamoeba* used for *histolytica* and *coli* in 1940, 1944, and other papers of similar date), Cleveland (Cleveland

and Sanders, 1930, and other papers), Pearse (1942), and Meglitsch (1940, in connection with a profound study of *blattae*). And there are many in various parts of the world who follow the same course; (for example, Wenyon, 1926; Dobell, 1919, 1938; Brumpt, 1936; Reichenow, 1928), so that it is not a question of individual or even minority disagreement in the question of taxonomic differentiation.

7. It is not my purpose in this paper to attempt to defend one position in taxonomy or attack the other. Because of the very large difference between the species *blattae* and *coli* in the nuclear structure of the trophic forms, I think that the burden of proof should rest on those who assert that the two amoebae belong in the same genus—especially when the same authors recognise as valid certain other genera of endozoic amoebae. A comprehensive analysis of the taxonomy of all amoebae, free living and endozoic, is much to be desired. Morris (1936) examined the problem so far as certain endozoic amoebae are concerned; but the result of his study is not conclusive, for it omitted from consideration certain other endozoic amoebae that would also have to have the status of sub-genera of *Entamoeba*, according to his treatment. The purpose of the present paper is nomenclatorial: it is an attempt to show that the word *Entamoeba* should remain available for a genus which *Ent. coli* is the type.

8. *Opinion 99* declares that those of us who think that the species *coli* and similar forms do not belong in the same genus as *blattae* cannot use the name *Entamoeba* for that different genus. There are two grounds upon which that declaration is based. One of them is that *Entamoeba* is a homonym of *Endamoeba*—that the two words are not sufficiently different from one another in orthography to be usable as separate words. The other is that *Entamoeba* has the same type species as *Endamoeba*, and therefore falls as a synonym. The latter decision is the only one given in the summary of *Opinion 99*; it is not necessary that it should be rendered after the generic name has been dismissed as a homonym, so evidently it is intended to provide a reserve in case of doubt.

9. That doubt certainly exists (Dobell, 1938). Obviously we are not here concerned with whether the words have the same meaning or not, but with whether one word is the same word as the other. There is a difference between inadvertent interchange of two names that have a status in zoological nomenclature, and the use synonymously of such words as endoplasm and entoplasm or endoderm and entoderm. There is nothing in the Articles of the International Rules of Zoological Nomenclature that justifies the conclusion that *Entamoeba* must be rejected as a homonym. Certainly Chatton's statement, although cited as authoritative by Stiles, does not constitute justification; it is merely an assertion in a one-line footnote, unsupported by reference to the Rules or anything else. It is only in the argument for *Opinion 99* that evidence is given, but that evidence can as well be read in

support of the retention of the two names as different. Jordan's report in the *Opinion* states that they come in the category of names of which the spelling in Latin varied to a slight extent and which the Rules of Nomenclature do not accept as different. His reference is to Article 35, in which precise differences are given by which specific names of the same origin and meaning are insufficiently distinguished. There seems to be no indication that Article 35 is intended to establish a general category allowing interpretation of other differences than those specified; and in that Article there is nothing whatever about the sort of difference that exists between the words *Endamoeba* and *Entamoeba*. Furthermore, there is evidence in *Opinion* 99 itself that the two words are not necessarily of the same origin, and that would exclude them from consideration under the rules given in Article 35.

10. Article 35 deals only with specific names, and it might seem possible that a different interpretation for generic names would be allowed. Now, however, a precise statement concerning differences in generic names has been given (*Opinion* 147, 1943). A generic name of the same origin and meaning as a previously published generic name is to be rejected as a homonym of the said name if it is distinguished therefrom only by certain specified differences which are the same as the ones given for specific names in Article 35. *Opinion* 99 was not mentioned by the Commission in the rendering of *Opinion* 147, although it dealt with the subject that was being considered.

11. It is not possible to find any definite reason in the Code, or any valid evidence in *Opinion* 99, for rejection of *Entamoeba* as a homonym; but the recommendation in Article 36 can, as Taliaferro remarked, be evoked in support of retention of both names. These facts have already been discussed by Dobell (1938).

12. In *Opinion* 99 the consideration that is apparently regarded as the more important one, since it alone is given in the summary, is that of synonymy—that *Entamoeba* C. & B. is an absolute synonym (or objective synonym, Stiles and Boeck, 1923, p. 135) of *Endamoeba* Leidy, because the names follow their types, and the same species, *E. blattae*, is the type of each. When Stiles presented the case so as to arrive at this conclusion, he changed his approach to the matter. In 1923 he evidently regarded *Entamoeba* as a homonym, in 1925 he designated it as a subjective synonym on the basis of the taxonomic assignment of its species, but in both papers he accepted *E. hominis* = *coli* as type of *Entamoeba* C. & B. by subsequent designation by Brumpt, 1913. In *Opinion* 99, after stating that Brumpt's action was the first type designation in words, Stiles found it possible to interpret Chatton, 1912, as having designated *blattae* as type of *Entamoeba* C. & B. Stiles did not make clear the reason for this interpretation, except in that he cited *Opinion* 6 in support of it.

13. *Entamoeba* C. & B., 1895, is analogous to the hypothetical Genus *A* Linnaeus, 1758, in *Opinion* 6, in that when proposed it contained two species, which we now know as *coli* and *blattae*. Casagrandi and Barbagallo did not indicate which was the type. *Opinion* 6 declares that when an author has removed one of the two species to another monotypic genus, leaving only one species in the first genus, he is to be construed as having fixed the type of the first genus. Jordan's report in *Opinion* 99 follows the parallel exactly, crediting Chatton with having removed *coli* from *Entamoeba* C. & B. to the genus *Löschia*, thereby leaving *blattae* as the type of *Entamoeba*. If that is so, there is probably no doubt about the validity of the conclusion ; but I think it is not true that Chatton really dealt with *Entamoeba* C. & B. in making the supposed division.

14. In every place in the three papers that Chatton wrote *Entamoeba* Leidy he was simply making a mistake for *Endamoeba* Leidy. Other authors before him who included *blattae*, with or without other amoebae in *Entamoeba* C. & B. were also making a simple error ; they should have used *Endamoeba* Leidy. The acts of Chatton and Lalung-Bonnaire were on *Endamoeba* Leidy, given by mistake as *Entamoeba* Leidy, but not corresponding to *Entamoeba* C. & B. Chatton (1910) grouped various amoebae in this "*Entamoeba* Leidy". Chatton and Lalung-Bonnaire (1912) did not agree with that grouping, and removed *coli* and other species from it, leaving only *blattae*. That made no change in the situation, except to restore it as it was originally. The revision was of the group concept authors had held of "*Entamoeba* Leidy"=*Endamoeba* Leidy, not of that genus itself, which was already attached to its type species.

15. The synonym argument in *Opinion* 99 depends upon crediting Chatton and Lalung-Bonnaire or Chatton with having comprehended *Entamoeba* C. & B. in what they did with "*Entamoeba* Leidy"=*Endamoeba* Leidy. Stiles' paragraph "d" in the argument, puts it : "Chatton's paper (1912, *Bull. Zool. France*, p. 113) is to be interpreted as designating *blattae* as type of "*Entamoeba*" 1897(=1895) [emendation of *Endamoeba*, but obviously construed as identical with *Entamoeba*]" (Chatton and Lalung-Bonnaire had priority in this matter, and the page reference is wrong.) But Chatton's "emendation of" (rather, error for) *Endamoeba* was "*Entamoeba* Leidy", not "*Entamoeba* 1897 (=1895)"; *Entamoeba* C. & B., 1895, was not an emendation, but a separately proposed word. Stiles' word "obviously" could have reference only to Chatton's opinion (1912) that the two words are orthographic variants, and therefore identical. Thus we return to the question of whether or not it is to be admitted that *Entamoeba* is a homonym of *Endamoeba*; and in consequence it appears to me that the whole argument of *Opinion* 99 stands or falls with the decision about the homonym question, in spite of the fact that the summary neglects that decision.

16. The summary of *Opinion* 99 presents the nomenclatorial treatment accorded *Entamoeba* C. & B. by Brumpt in 1913 as opposed to and invalidated by the prior treatment of that genus in the 1912 paper. On the contrary, however, it seems that Chatton and Brumpt had then exactly the same understanding of Casagrandi and Barbagallo's genus. In the historical account given above in 1897 Casagrandi and Barbagallo applied the name *Entamoeba* to intestinal amoebae of vertebrates, and the statement by Chatton (1912, p. 111) that those authors applied the name to a human amoeba. Those are the only references in the 1912 papers to the correct and original use of *Entamoeba*. Brumpt, who in 1913 wrote "*Entamoeba* Leidy," had adopted the nomenclature of amoebae used by Chatton in 1910. In the footnote that was accepted by Stiles as constituting the type designation he simply gave a different wording of what the 1912 authors had pointed out regarding the amoeba for which the genus *Entamoeba* C. & B. had been proposed; but in that wording, and in printing the name "*E. hominis* synonyme de *E. coli*" he was more specific. Brumpt has more recently used both *Endamoeba* and *Entamoeba*; and it is likely that the 1912 authors would have used Casagrandi and Barbagallo's name for the species *coli* and other amoebae of vertebrates instead of *Löschia* except for the fact that they considered *Endamoeba* and *Entamoeba* to be orthographic variants. Despite the fact that Chatton and Brumpt evidently had the same understanding of *Entamoeba* C. & B., Stiles found it possible to give the interpretation that Chatton had designated *blattae* as its type before Brumpt designated *coli* as its type. Yet the only difference in the treatment the two authors gave the genus is that the former did not print the species name, whereas the latter did so. Brumpt, therefore, was not considered to have comprehended *Entamoeba* C. & B. in "*Entamoeba* Leidy", as regards type designation, whereas Chatton was considered to have done so. The interpretation given in this part of the argument in *Opinion* 99 is obviously greatly strained.

### CONCLUSION

17. *Opinion* 99 of the International Commission on Zoological Nomenclature does not constitute proof that *Entamoeba* Casagrandi and Barbagallo, 1895, cannot be used as a generic name. Its argument rests on two points: that *Entamoeba* is a homonym of *Endamoeba*; and that *blattae* is the type species of both, so that *Entamoeba* falls also as a synonym of *Endamoeba* Leidy, 1879. The latter point, which is the only one brought out in the summary of *Opinion* 99, is not acceptable: it rests on the interpretation that *Entamoeba* is a homonym of the earlier name. The *Opinion* asserts, but does not demonstrate, that it is a homonym; and there is nothing elsewhere in the Rules or *Opinions* that warrants the assertion. It is appropriate to place the species *coli* and *blattae* in separate genera; and it is considered that *Entamoeba* Casagrandi and Barbagallo, 1895, is available

as a generic name for *coli* and congeneric species at the same time that *Endamoeba* Leidy, 1879, is used for *blattae* and congeneric species.

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2. The second of the three documents which together constitute the application in the present case was a paper by Dr. Ellsworth C. Dougherty (*University of California, Department of Zoology, Berkeley, California, U.S.A.*). Dr. Dougherty first submitted this paper in July 1946, but, as explained in paragraph 8 below, he decided in August 1948 to revise his paper in the light of the discussions then just closed which had taken place during the Public Sessions held by the International Commission on Zoological Nomenclature in Paris in July 1948. Dr. Dougherty completed the revision of his paper in May 1950. Correspondence ensued between the Secretary and Dr. Dougherty on certain points arising on the latter's paper, but these were cleared up by the autumn of that year, thus making it possible for Dr.

Dougherty's paper to be formally submitted on 11th October 1950. Dr. Dougherty's paper was as follows :—

**On the problems embraced in "Opinion" 99 (relating to the names "Endamoeba" Leidy, 1879, and "Entamoeba" Casagrandi and Barbagallo, 1895) rendered by the International Commission on Zoological Nomenclature**

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**1. Introduction.**

Recently Professor Harold Kirby (1945) has written an able critique of the decisions embodied in *Opinion* 99 rendered by the International Commission on Zoological Nomenclature (1928). He has concluded that, contrary to certain of these decisions, (1) *Entamoeba* Casagrandi and Barbagallo, 1895, cannot be regarded as a homonym of *Endamoeba* Leidy, 1879; and (2) the species with the trivial name *blattae* of Bütschli (1878) should not, despite the conclusions embodied in *Opinion* 99, be regarded as the type species of both genera, but only of *Endamoeba* Leidy, 1879.

2. I endorse Kirby's thesis wholeheartedly, but I should like to restate the problem in order to emphasize what I consider to be certain fallacies in *Opinion* 99, which are not altogether covered by Kirby, and to make certain further proposals. *Opinion* 99 is a remarkable collection of contradictions and apparent misinterpretations of the *Règles* and certain preceding *Opinions*, as I am prepared to show here.

3. Originally a draft of the present paper was submitted to Mr. Francis Hemming, Secretary of the International Commission, in 1946. Subsequently the author visited Mr. Hemming in August, 1948, and it was agreed between them that, in view of the extensive changes that the Thirteenth International Congress of Zoology, acting on the advice of the International Commission, brought about in the *Règles Internationales de la Nomenclature Zoologique* at the Paris Meetings of July, 1948, the paper should be examined in the light of any pertinent new decisions, revised, and submitted again. I have delayed doing this in anticipation of the publication of the "Official Record of Proceedings of the International Commission on Zoological Nomenclature at their Session, held in Paris in July, 1948". Now that this has been done in Volume 4 of *The Bulletin of Zoological*

*Nomenclature*, I have been able to redraft the present paper and am resubmitting it herewith.

4. One of the decisions taken by the International Commission at Paris was that *Opinion 99* was to be considered *sub judice* and that specialists were to be invited "to communicate to the Commission their views on the action to be taken by way of confirming, modifying or reversing the decisions recorded in [the *Opinion*]" (see 1950, *Bull. zool. Nomencl.* 4 : 337—338). This was done on the basis of the recognition by the Secretary to the International Commission that *Opinion 99* was "very poor" and should be reconsidered (see 1950, *Bull. zool. Nomencl.* 3 : 128). It is, therefore, particularly appropriate that the present paper be tendered for publication.

5. Moreover, it will be evident from the ensuing sections of this paper that it is of vital importance to the stability of the names of certain genera and species of amoebae parasitic in Man and other animals, that the International Commission not only revise *Opinion 99*, but consider such additional problems not originally raised therein as must be solved in order to give permanency to the names of these parasites. This will require the exercise of the Plenary Powers to secure certain names and the placing of these and other names in the *Official List of Generic Names in Zoology*, and the *Official List of Specific Trivial Names in Zoology*, as provided for at Paris (see 1950, *Bull. zool. Nomencl.* 4 : 267—271, 333—335).

6. To aid both in the revision of *Opinion 99* and in the realization of stability for the names applied to important enteric amoebae, the present paper is organized into several sections: (I) the present introduction; (II) the historical background of *Opinion 99*; (III) and (IV) analyses of the summary and body, respectively, of *Opinion 99*; (V) the status of the trivial names *coli* of Grassi (1879) and *histolytica* of Schaudinn (1903) as applied to certain amoebae of Man; and (VI) the status of the generic names *Endamoeba* Leidy, 1879, *Entamoeba* Casagrandi and Barbagallo, 1895, and certain others applied to enteric amoebae. Finally, in section (VII) are summarized the conclusions drawn from the studies of the preceding sections.

## II. Historical Background of "Opinion" 99.

7. *Opinion 99* is entitled "*Endamoeba* Leidy, 1879, vs. *Entamoeba* Casagrandi and Barbagallo, 1895". Its summary reads as follows: "*Entamoeba* 1895, with *blattae* as type by subsequent (1912) designation, is absolute synonym of *Endamoeba* Leidy, 1879a, p. 300, type *blattae*, and invalidates *Entamoeba* 1895, type by subsequent (1913) designation *hominis=coli*".

8. To recapitulate briefly, the following are the principal historical facts\* of the case treated by *Opinion* 99, many of which were not, however, considered in the *Opinion* :

- (i) Lösch (1875) described in detail the clinical picture and lesions resulting from an amoebic infection in the large bowel of a young Russian and also provided a description (pp. 203—207) and figures (Pl. x, figs. 1—3), of the causative organism from which it is quite evident that he was dealing with the species now generally called *Entamoeba*, or *Endamoeba*, *histolytica*. To this form he gave the name *Amoeba coli* ( : 208).
- (ii) Bütschli (1878 : 273—277) described a new species, *Amoeba blattae*, from the gut of the oriental roach, *Blatta orientalis* Linnaeus, 1758—an insect still known by that name.
- (iii) Grassi (1879) described amoebae from human faeces and identified them (p. 445) as representing the same species as observed by Lösch (1875). However, in the opinion of Dobell (1919), Grassi dealt primarily with the species now generally known as *Entamoeba*, or *Endamoeba*, *coli*, although some individuals, at least, of *E. histolytica* were apparently also seen.
- (iv) Leidy (1879 : 300) formed the new genus *Endamoeba* for the single species, hence type species (by monotypy : Article 30(c) of the current *Règles*†) *Amoeba blattae* Bütschli, 1878.
- (v) Casagrandi and Barbagallo (1895 : 18) in a study of an intestinal amoeba of Man, which they called “*Amoeba coli* Lösch”, erected a new genus *Entamoeba* in apparent ignorance of the existence of the name of *Endamoeba*‡ Leidy, 1879. In it they placed “*Amoeba coli* (Lösch)” and “*Amoeba blattarum* (Bütschli)” [= *Amoeba blattae* Bütschli, 1878]. No type species was designated. It is evident from their paper that these

\* For a more detailed history the excellent monograph by Dobell (1919) should be consulted—also the less lucid, although more exhaustive, survey of Stiles and Boeck (1923).

† The most recent presumably official edition of the *Règles* appeared in 1929 in the publication of the X[1927] International Congress of Zoology at Budapest (Int. Comm. Zool. Nomencl. 1929). A new official edition is now in preparation based on extensive changes adopted by the XIII International Congress of Zoology at its Paris Meeting in 1948, acting on the advice of the International Commission on Zoological Nomenclature.

‡ In base a tutti questi dati, anzi, riteniamo necessario tornare sulla classifica delle *Amebe*, stabilendone un nuovo genere, che proponiamo di chiamare *Entamoeba* e vi collochiamo subito l'*Amoeba coli* (Lösch), e l'*Amoeba blattarum* (Bütschli).

authors were dealing not with Lösch's *Amoeba coli*, but with Grassi's—the species today known generally as *E. coli*. They did not themselves form the combination *Entamoeba coli*, although it is credited to them by Dobell (1919); actually this was later done by Schaudinn (1903). In a subsequent paper they (Casagrandi and Barbagallo, 1897 : 103) renamed this species *Entamoeba hominis*.

- (vi) Schaudinn (1903) was responsible for fixing the usage of the trivial names now almost universally employed for the two species of amoebae in humans, originally designated *Amoeba coli* by Lösch (1875) and *Amoeba coli* by Grassi (1879)—what may aptly be termed the dysenteric and large non-dysenteric amoebae of Man, respectively. As Dobell (1919) has pointed out, by far the happiest solution would have been for Schaudinn to accept Lösch's name for the dysenteric species, as would have been correct, and, in view of the fact that Grassi's name was a homonym of Lösch's, to take the next available name, *Entamoeba hominis* Casagrandi and Barbagallo, 1897, for the non-dysenteric species. His observations on morphology as well as nomenclature were on several counts erroneous and have been severely and justifiably criticised by Dobell. His nomenclatorial conclusions were that the non-dysenteric species should be called "*Entamoeba coli* Lösch emend. Schaudinn" (: 564) and that the dysenteric species should be given a new name, for which he proposed "*Entamoeba histolytica*" (: 564, 570). In so doing, he accepted the genus *Entamoeba* Casagrandi and Barbagallo, 1895, for both species. Schaudinn's prestige was such that his determinations became entrenched in the literature, and today the trivial names, at least, dominate all fields concerned with amoebae in Man.
- (vii) Lühe (1909 : 421) erected the new genus *Poneramoeba* for the single species, *Entamoeba histolytica* Schaudinn, 1903, from Man; this he specifically designated as the type species of his new genus. It was the next new genus after *Entamoeba* Casagrandi and Barbagallo, 1895, erected or used for amoebae in the vertebrate digestive tract.
- (viii) Chatton (1910 : 282—284) placed in a genus "*Entamoeba* Leidy (1879)" seven supposed species. "*Entamoeba coli* (Lösch) 1875" [= *Amoeba coli* Grassi, 1879], "*E. blattae* (Bütschli) 1878"; "*E. ranarum* (Grassi) 1881" "*E. muris* (Grassi) 1881"; "*E. buccalis* Prowazek, 1904"; "*E. histolytica* Schaudin, 1903"; and "*E. tetragena* Viereck 1906=*E. africana* Hartman 1908" [= *E. histolytica*]. The only mention of Casagrandi and Barbagallo's work appearing in Chatton's paper was in a footnote to the effect that "*Entamoeba*"

had been incorrectly assigned by Doflein (1909) to the authorship of the Italian workers.\* Chatton did not cite any species as the type species of his “*Entamoeba*”, nor did he mention the spelling “*Endamoeba*” used by Leidy.

- (ix) Chatton and Lalung-Bonnaire (1912 : 142) removed the amoebae of the digestive tract of vertebrates from the genus “*Entamoeba* Leidy” into a new genus *Löschia*, stating that only the species, originally called *Amoeba blattae* by Bütschli (1878) should remain in Leidy’s genus. To *Löschia* they transferred the following four species from *Entamoeba* : “*E. coli* Lösch” [=Grassi], “*E. tetragena* Viereck” [=*histolytica* Schaudinn], “*E. ranarum* Grassi”, and “*E. muris* Grassi”, and for the forms with a *tetragena*-[=*histolytica*-] like nuclear picture they raised a new subgenus *Viereckia*. “*E. coli* Lösch” was designated as the type species of the nominotypical subgenus, hence of the genus, *Löschia*.† They incorrectly claimed that Casagrandi and Barbagallo (1897) had applied Leidy’s genus to the amoebae of the vertebrate digestive tract.‡
- (x) Chatton (1912 : 111) republished the conclusions already expressed in his paper with Lalung-Bonnaire, but mentioned only “*Löschia coli*” and “*Viereckia tetragena*” in the genus *Löschia*. For the first time he mentioned—in a footnote—the spelling *Endamoeba*,§ but dismissed it as an orthographic variant.
- (xi) Brumpt (1913 : 25) referred the amoebae of Man to the genus “*Entamoeba* Leidy, 1879”. He also stated—in a footnote—that the same genus had been created in “1897” by Casagrandi and Barbagallo for¶ “*E. coli*”.
- (xii) Crawley (1913 : 185) listed “*Entamoeba histolytica* Schaudinn, 1903” as the type species of the genus *Entamoeba*.

\* C’est à tort que Doflein (1910 [= 1909]) attribue la paternité du genre *Entamoeba* à Casagrandi et Barbagallo (1897 [*sic*]).

† On pourra même distinguer subgénériquement les Entamibes à 4 noyaux (type *tetragena*), des Entamibes à 8 noyaux (type *coli*), sous le nom de *Viereckia n. subgen.*

‡ C’est Leidy qui a créé le genre *Entamoeba* pour l’amibe de la Blatte, et ce n’est qu’en 1897 que Casagrandi et Barbagallo l’ont appliquée aux amibes intestinales des Vertébrés.

§ Avec la variante orthographique *Endamoeba* qui ne peut en aucune façon constituer un prétexte à conserver les deux noms simultanément.

¶ Ce même genre a été créé de nouveau en 1897 par Casagrandi et Barbagallo pour leur *E. hominis*, synonyme de *E. coli*.

- (xiii) Dobell (1919 : 17—19) in a scholarly review of the nomenclature of the amoebae in Man accepted as valid for amoebae of the vertebrate digestive tract the genus *Entamoeba* Casagrandi and Barbagallo, 1895 (*non Endamoeba* Leidy, 1879), formally ( : 18) selected as its type species “*E. coli*”, and included as congeneric with *E. coli* the species *E. histolytica*, among others. He confined the genus *Endamoeba* Leidy, 1879, to *Amoeba blattae* Bütschli, 1878. In later parts of his paper he reviewed in detail the nomenclatorial history of the species today generally known by the trivial names *coli* and *histolytica*.
- (xiv) Stiles and Boeck (1923 : 121—150) exhaustively discussed the nomenclature of the dysenteric and non-dysenteric amoebae of Man and dismissed ( : 124) *Entamoeba* Casagrandi and Barbagallo, 1895, as a homonym\* of *Endamoeba* Leidy, 1879. Nevertheless they regarded Brumpt (1913) as having fixed the type species of the former as *Entamoeba hominis* [= *Amoeba coli* Grassi, 1879], and they also recognized a separate nominal genus *Entamoeba* Chatton, 1912 (overlooking Chatton's 1910 paper and not recognising the priority of Chatton and Lalung-Bonnaire's paper) as an emendation of *Endamoeba* Leidy, 1879, consequently with the same type species, *Amoeba blattae* Bütschli, 1878. They provisionally regarded *Amoeba blattae* Bütschli, 1878 (type species of *Endamoeba* Leidy, 1879—by monotypy), and *Entamoeba hominis* Casagrandi and Barbagallo, 1897 [= *Amoeba coli* Grassi, 1879] as congeneric. The foregoing conclusions were essentially followed by Stiles and Hassall (1925), except that they listed *Entamoeba* Casagrandi and Barbagallo, 1895, as a synonym rather than a homonym of *Endamoeba* Leidy, 1879.
- (xv) The International Commission on Zoological Nomenclature in *Opinion* 95 (1926) placed *Endamoeba* Leidy, 1879, with type species *Amoeba blattae* Bütschli, 1878 (by monotypy) on the *Official List of Generic Names in Zoology*. Later the International Commission (1928) reviewed some of the facts given here under paragraphs (i) to (xiv), and published *Opinion* 99. After much indecisive discussion it was finally concluded in the summary of the latter *Opinion*, that Chatton (1912) had selected a type species for “*Entamoeba* 1895”, when he transferred *Entamoeba coli* and other species in vertebrates to the genus *Löschia* and thus left only *Entamoeba blattae* in the genus *Entamoeba*. This conclusion was presumably based on *Opinion* 6, which was invoked in the body of the *Opinion*. Obviously, it was not questioned whether

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\* [*Entamoeba* 1895 is not available because of *Endamoeba* 1879.]



Chatton actually was dealing with *Entamoeba* Casagrandi and Barbagallo, 1895, when he supposedly fixed its type species.

9. I proposed herein to analyse in detail in Sections III and IV, on the summary and body of *Opinion* 99 respectively, the question of the selection of a type species for the genus *Entamoeba* Casagrandi and Barbagallo, 1895, and to show that from the historical facts it must be concluded that no one actually selected its type before Dobell (1919).

### III. Analysis of the Summary of "Opinion" 99.

10. First of all it can be shown that the summary of the *Opinion* itself cannot be supported by the *Règles* and previous *Opinions*. The crux of this summary is based upon one point in the general conclusions of the body of the *Opinion*, and in the report by Commissioner K. Jordan, which appears at the end of the discussion on the *Opinion* and was unanimously adopted by the Commissioners present at the Tenth International Congress of Zoology in Budapest, 1927. In this summary, as one can read in the quotation thereof already given, appears the following phrase: "*Entamoeba* 1895, with *blattae* as type by subsequent designation (1912)". This is presumably based on the following statement in Jordan's report (: 8, under "A. Nomenclatorial Considerations"): "In 1912 Chatton separated from *Entamoeba* the species *coli* as genotype of his new genus *Löschia*, leaving *blattae* as only species in *Entamoeba*. As nobody had dealt, nomenclatorially, with *Entamoeba* prior to 1912, Chatton's action made *blattae* the type of *Entamoeba*". Actually Chatton and Lalung-Bonnaire (1912) were the first to do this; Chatton (1912) merely reaffirmed their earlier action.

11. Now the foregoing quotation is an important statement as it suggests that a species may become the "type by elimination". Yet in the present *Règles* (Article 30(k)) the designation of "type by elimination" is only one of a number of non-mandatory *Recommendations*. It is true that under one limited condition the *Opinions* have established that elimination may fix a type species. Thus in *Opinion* 6\* (Int. Comm. Zool. Nomencl., 1910, 1944b), the summary reads (in its most recent form—1944b): "When, in the case of a generic name published not later than 31st December 1930 a later author divided the genus 'A—', species 'A— b—' and 'A— c—', leaving genus 'A—', only species 'A— b—', and genus 'C—', monotypic with species 'C— c—', the second author is to be construed as having fixed the type of the genus 'A—'." But, as pointed out by Mr. Francis Hemming, Secretary to the Commission, in his editorial notes on the new edition of *Opinion* 6

\* Now cancelled, except for historical purposes, and its decisions incorporated into the *Règles* (see 1950, *Bull. zool. Nomencl.*, 4 : 157, 165—166).

(1944b : 134—135), the above summary is explicit in limiting its jurisdiction to the case where the original genus “A—” has two species and two species only, and the second genus “C—” is monotypic.\*

12. Let us suppose then, for the sake of argument, that Chatton and Lalung-Bonnaire (1912) comprehended *Entamoeba Casagrandi* and Barbagallo, 1895, when they transferred species from “*Entamoeba*” to *Löschia*. In this light one finds that *Entamoeba Casagrandi* and Barbagallo, 1895, qualifies as genus “A—” in the sense of *Opinion 6*—with two species “*Amoeba coli*” and “*Amoeba blattarum*”. However, Chatton and Lalung-Bonnaire’s genus “C—” in the sense of *Opinion 6* would be *Löschia*, which emphatically was not monotypic. The vital point here is that it was formed for four species in two subgenera : *Löschia* and *Viereckia*.

13. It may be claimed that, in effect, *Opinion 99* established a new precedent and extended the application of selection of “type by elimination” beyond *Opinion 6*. But it does not appear that such was the intention of Commissioner Jordan or of Secretary Stiles. Actually they were merely invoking *Opinion 6* as the following quotations from the body of the discussion on the *Opinion* indicates : (p. 6, ¶ 3) “. . . accordingly, for Chatton *Endamoeba* 1879 and *Entamoeba* 1897 were simple orthographic variants and it is not at all impossible (renaming and cf. *Opinion 6*)” [italics mine—E. C. D.] “to construe his papers (1910, 282, and 1912, 110) as a designation of *blattae* as type of *Entamoeba Casagrandi* and Barbagallo, 1897” ; (P. 7, ¶ 2 (d)) “since (under *Opinion 6*) Chatton’s paper (1912, *Bull. Soc. zool. France* : 113) is to be interpreted as designating *blattae* as type of “*Entamoeba*” 1897 (=1895), [emendation of *Endamoeba*, but obviously construed as identical with *Entamoeba*] . . .”. But *Opinion 6*, as it is now understood, does not apply here. It is clear

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\* Prior to the Congress of 1948, not all workers agreed with Mr. Hemming that *Opinion 6* need be so narrowly interpreted. Thus Sabrosky (1947) analysed the body of the *Opinion* and pointed out that in paragraph 2 the statement was made that “cases which were as clear as the one given in the diagram [i.e., the scheme presented in the summary] should be construed under Article 30(g), namely, that the type of the original genus was fixed when, through a division of its species, it was definitely made into a monotypic genus”. It was Sabrosky’s contention on the basis of this statement that a genus “A—” need not have two species in order to come under the jurisdiction of *Opinion 6*, so long as all but one species have been removed by some subsequent worker, thus leaving “A—” monotypic. Sabrosky’s interpretation is a reasonable one. However, the summary of *Opinion 6*, as it stands, conveys no such flexibility of interpretation and must, it seems to me, be the principal arbiter of the point. Moreover, the International Commission at Paris recommended in its report, which was accepted by the Thirteenth Congress, *inter alia*, the insertion in Article 30, Rule (g), of words to convey the substance of the summary of *Opinion 6*, i.e., only the limited interpretation thereof (see 1950, *Bull. zool. Nomencl.* 4 : 157) ; moreover, *Opinion 6* has now been cancelled for interpretative purposes (see previous footnote).

that the Commission based the most vital part in the summary of *Opinion* 99 on an invocation of a previous ruling, which at the time was, at best, of questionable application and must now be regarded as erroneously applied.\*

#### IV. Analysis of the Body of "Opinion" 99.

14. Since it has been demonstrated that the summary of *Opinion* 99 and in effect its conclusions are based on false premises, it would be well to examine the other points discussed in the body of *Opinion* 99 and to analyse the historical facts to determine why, as I consider, (1) no other and justifiable grounds exist for an equivalent decision—namely, that the type of *Entamoeba* Casagrandi and Barbagallo, 1895, was fixed as *Amoeba blattae* Bütschli, 1878; and (2) why a type selection was not made until Dobell's work (1919).

15. Dobell (1938) has published a critique of *Opinion* 99 in which he has pointed out certain fundamental inconsistencies in the presentation and body of the *Opinion*, but has not considered all of the basic nomenclatorial issues involved. Kirby (1945)<sup>2</sup> has aired most of the fallacies of the *Opinion*. My analysis is partly an extension of his, with additional observations on applications of certain provisions of the *Règles* and *Opinions*. Dobell's works (1919, 1938) have been indispensable for their complete accounts of the history and zoology of the enteric amoebae of Man.

16. There are three principal statements or assumptions in the body of *Opinion* 99 that deserve attention. These may be summarised as follows:—

- (i) The point, not brought out in the "Summary", but nevertheless expressed by Secretary Stiles in several places in his discussion—that *Entamoeba* is a virtual homonym of *Endamoeba*. This was summarised by Commissioner K. Jordan under "Philological Considerations" (: 8) as follows: "In zoology the prefixes *Ento*— and *Endo*— are frequently interchanged. In zoological terminology they are located as being identical. They come under the category of names of which the spelling in Latin varied to a slight extent and which the Rules of Nomenclature do not accept as different, such as *auctumnalis* and *autumnalis* . . . *Entamoeba* is philologically the same as *Endamoeba*". Despite this conclusion, the body of the discussion (: 5, ¶ 4) contains evidence that the prefixes

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\* Cancelled except for historical purposes, and part of its decision to be incorporated into the *Regles* (see 1950, *Bull. zool. Nomencl.*, 4 : 161—162, 165—166). See also footnote to paragraph 11.

<sup>2</sup> See para. 1 of the present *Opinion*, where Professor Kirby's paper is reprinted.

*endo*— and *ento*— can be regarded as of different Greek origin (from ἔνδοον and ἐντός respectively).

- (ii) The point that Chatton's emendation *Entamoeba* (1910) of Leidy's *Endamoeba* (1875) automatically takes the same type, *Amoeba blattae* (: 6, π 2). "*Endamoeba* Leidy, 1879a, p. 300, has for its monotype *Amoeba blattae*. The generic name was emended by Chatton, 1910, Ann. Zool. exp. gén., 282, and 1912, Bull. Soc. Zool. France, p. 110, to read *Entamoeba*, and by Chatton and Lalung, 1912, BSPE, p. 142, in the same sense. Accordingly, there is a generic name *Endamoeba* and one *Entamoeba* with the same species (*E. blattae*) as type".
- (iii) The point that Brumpt (1913) among others may be regarded as having selected the type species of *Entamoeba* Casagrandi and Barbagallo, 1895 (: 6, π 2). "... The first type designation in words was by Brumpt (1913, p. 21) as *Entamoeba hominis* which is *Amoeba coli* renamed".

17. Of these three points the first has been demonstrated to be incorrect by Dobell (1938) and Kirby (1945); the second is demonstrably true; and the third is equivocal. All three are taken up in order in the following three sub-sections ((a) to (c)).

(a) Orthographic independence of *Endamoeba* and *Entamoeba*.

18. As Dobell (1938) pointed out, the *Règles* themselves provide a basis for accepting both *Endamoeba* and *Entamoeba*. Article 34 states that "a generic name is to be rejected as a homonym when it has previously been used for some other genus of animals". In connection with rejection of such names as homonyms, Article 36 contains the following recommendation: "It is well to avoid the introduction of new generic names which differ from generic names already in use only in termination or in a slight variation in spelling. But when once introduced, such names are not to be rejected on this account. Examples: *Picus*, *Pica* . . .".

19. But, if one may question the legal force of a "Recommendation" then *Opinion* 147\* (Int. Comm. Zool. Nomencl., 1943), as Kirby (1945) has pointed out, specifically delimits the categories of spellings that render generic names homonyms, to those differing by: (1) the use of "ae", "oe", and "e"; the use of "ei", "i", and "y"; or the use of "c" and "k"; (2) the aspiration or non-aspiration of a consonant; (3) the presence or absence of a "c" before a "t";

\* Cancelled, except for historical purposes, and part of its decision to be incorporated into the *Règles* (see 1950, *Bull. zool. Nomencl.*, 4 : 161—162, 165—166).

and (4) the use of a single or double consonant. The difference between the prefixes *Endo*— and *Ento*— thus lies outside of the limits imposed by *Opinion* 147.<sup>3</sup>

(b) Selection of type species for *Entamoeba* Chatton, 1910.

20. Kirby has pointed out that Chatton (1910) referred to the genus *Endamoeba* Leidy, 1879, as “*Entamoeba* Leidy”. As used by Chatton, it included, as already noted, the type species of Leidy’s genus, *Amoeba blattae* Bütschli, 1878, and a number of other species, among them “*Amoeba coli* Lösch” [= *Amoeba coli* Grassi, 1879]. I believe that Chatton unintentionally changed the spelling of Leidy’s genus, thus in effect creating a new name for it, which should be termed *Entamoeba* Chatton, 1910. (No previous author spelled Leidy’s genus in this way, Schaudinn (1903) and others that used the spelling *Entamoeba* having credited it to Casagrandi and Barbagallo.) Stiles and Boeck (1923 : 123) must have come essentially to the same conclusion when they recognised both *Entamoeba* Casagrandi and Barbagallo, 1895, and *Entamoeba* Chatton, 1912 [=1910]. Their action supports my contention that Chatton thus was actually not dealing with the genus *Entamoeba* Casagrandi and Barbagallo, 1895, his only reference to the latter being in error—namely that “*Entamoeba*” should be credited to Leidy, not to the Italian workers. *Entamoeba* Chatton, 1910, is a homonym of *Entamoeba* Casagrandi and Barbagallo, 1895 ; but there is no basis for assuming them to be objective synonyms, as the writers of *Opinion* 99 appear to have believed, inasmuch as the type species of the latter genus had not then been determined.

21. We thus actually have three nominal genera : *Entamoeba* Leidy, 1879 (monotypic), *Entamoeba* Casagrandi and Barbagallo, 1895 (2 species), and *Entamoeba* Chatton, 1910 (7 species, including those in the second genus). As Kirby has maintained, the consequence of any action by Chatton (1910, 1912) and Chatton and Lalung-Bonnaire (1912) should affect only the genus with which Chatton originally dealt—which I call *Entamoeba* Chatton, 1910 (= *Endamoeba* Leidy, 1879, emended). This principle was expressly recognized by the Paris Congress of 1948 and is now to be incorporated in the *Règles* (see 1950, *Bull. zool. Nomencl.* 4 : 347—348).

22. I wish now to take up the second point raised by the body of *Opinion* 99, namely, whether Chatton (1910) can be construed as having fixed the type of *Entamoeba* Chatton, 1910. In this connection Article 30(f) is involved.

<sup>3</sup> The provisions of Article 34 were further revised by the Fourteenth International Congress of Zoology, Copenhagen, 1953, which adopted a provision that a generic name is to be treated as a homonym of another such name if it differs from it in spelling by even one letter (1953, *Copenhagen Decisions zool. Nomencl.* : 78, Decision 152).

23. Article 30 Rule (f) states that "in case a generic name without originally designated type is proposed as a substitute for another generic name with or without type, the type of either, when established, becomes *ipso facto* type of the other". Inasmuch as *Entamoeba* Chatton, 1910, is in effect a substitute for *Endamoeba* Leidy, 1879, it follows that *blattae*, type of the earlier genus by monotypy, automatically becomes type of the later genus. Therefore, it is difficult to understand why the Commission, in the summary of *Opinion* 99, did not rely on this rule to establish the type species of *Entamoeba* of Chatton (1910) instead of invoking *Opinion* 6, which was not clearly applicable. Actually, Rule (f) in Article 30 has certain difficulties of application to which I hope to draw the attention of the Commission in a separate communication. Possibly it is on the basis of these difficulties that the Commissioners failed to invoke it in the summary of *Opinion* 99. In any event, the application of this rule seems straightforward in the case under consideration.

(c) Selection of a type species for *Entamoeba* Casagrandi and Barbagallo, 1895.

24. We can now examine the third point raised by the body of *Opinion* 99, namely, that Brumpt (1913) may be regarded as having made a statement that, were it not for Chatton's earlier action (1912), would have had the effect of selecting a type species for *Entamoeba* Casagrandi and Barbagallo, 1895. In this connection it also is desirable to determine when such a selection was validly made and also to explore further the consequences of Chatton's treatment of his genus, *Entamoeba* (= *Endamoeba* Leidy, 1879). Aside from *Opinion* 6, which has already been shown to be inapplicable, one Article in the *Règles* and two *Opinions* are intimately involved in these problems—namely, Article 30 and *Opinions* 45 and 164.

25. Brumpt (1913), as already stated, made the following statement (in translation ; for original see last footnote on page 23) : " This same genus " [as *Entamoeba* Chatton, 1910 = *Endamoeba* Leidy, 1879] " was created *de novo* in 1897 by Casagrandi and Barbagallo for their *E. hominis*, synonym of *E. coli* ". It was on this basis that Stiles and Boeck (1923), Stiles and Hassall (1925), and the Commission (in *Opinion* 99) concluded that what Brumpt's statement amounted to was a potential selection of a type species for *Entamoeba* Casagrandi and Barbagallo, 1895.

26. I feel that this position is inconsistent with the *Règles* and with the previously rendered *Opinion* 45 (Int. Comm. Zool. Nomencl., 1912).

27. Article 30, which deals with the designation, indication, and selection of type species of genera, contains a paragraph following paragraph (g) which reads as follows: "The meaning of the expression 'select the type' is to be rigidly construed. Mention of a species as an illustration or example of a genus does not constitute a selection of type". Several *Opinions* have been rendered specifically dealing with the concept of type selection "rigidly construed". Most of these do not apply to the present case except that all up to *Opinion* 99 demonstrate a strict approach to the question of type selection. *Opinion* 45, however, is of considerable significance to the question under consideration.

28. The summary of *Opinion* 45 reads as follows: "So far as one can judge from the premises submitted, the type of *Syngnathus* Linnaeus, 1758, has never been definitely designated, and there is no objection to designating, as such, the species *acus* Linnaeus to accord with general custom and convenience". Without going into the entire history of this case it can be briefly stated that the genus *Syngnathus* Linnaeus, 1758, with seven original species was restricted by Rafinesque (1810b) to two species—a Linnean species, *Syngnathus aequoreus*, hence the only one of the original species, and a new species, *Syngnathus punctatus* Rafinesque, 1810. He did not select a type species, nor had any previous author. No type selection was made during the rest of the 19th century. However, Jordan and Evermann (1896: 774) gave in the synonymy of "*Syngnathus*, Linnaeus" the following citation: "*Syngnathus*, Rafinesque, Caratteri, 18, 1810 (restricted to *aequoreus*)". Actually, as is pointed out in *Opinion* 45, Rafinesque (1810a), in the reference cited by Jordan and Evermann, did not mention the genus *Syngnathus*; this was done in the later work (1810b). It was the conclusion of the Commission that Jordan and Evermann did not thereby select a type species for the genus *Syngnathus* Linnaeus, 1758.

29. Now it seems to me that in the cases of *Syngnathus* of Jordan and Evermann (1896) and *Entamoeba* of Brumpt (1913) are parallel. In both cases statements, not strictly accurate, were made by later authors about the genera of earlier workers. In neither case was there an unequivocal selection of a type species. Yet the Commission saw fit in the first case to determine that Jordan and Evermann's statement, "restricted to *aequoreus*", was not, "rigidly construed", a type selection, whereas Brumpt's statement, "created *de novo* . . . for . . . *E. hominis*" was such a selection. As indicated, Brumpt's statement erred, for actually Casagrandi and Barbagallo raised *Entamoeba* for two species: "*Amoeba coli*" and "*Amoeba blattarum*".

30. *Opinions* 45 and 99 are, I feel, in essential disharmony on the point discussed. Whereas *Opinion* 99 is the later and might be held as superseding *Opinion* 45, the point in which the latter is inconsistent with the former is the fundamental issue of its case and that of *Opinion*

99 is a secondary issue. I do not believe that the International Commission meant, in effect, to reverse *Opinion* 45 in *Opinion* 99. Furthermore I feel that the decision that Brumpt (1913) selected a type species for the genus *Entamoeba* Casagrandi and Barbagallo, 1895, is inconsistent with the spirit of the phrase "rigidly construed" in Article 30.

31. Having considered Brumpt (1913), we can now return to Chatton (1910). A point, the significance of which has not so far been examined, is that the genus *Entamoeba* Chatton, 1910, actually included the two species placed by Casagrandi and Barbagallo in their genus. Some may argue that in so doing Chatton actually comprehended the Italian workers' genus despite his designation "*Entamoeba* Leidy". This is not necessarily so, however. A genus is rigidly defined by its type species; unless or until a type species is designated or selected, a given genus is of necessity a plastic entity to a greater or lesser degree. Chatton in effect united *both* Leidy's and Casagrandi and Barbagallo's genus in his *Entamoeba*.

32. What happened, in effect, was that Chatton incorrectly—from the standpoint of priority—included *Entamoeba* Casagrandi and Barbagallo, 1895, in synonymy with his *Entamoeba* (1910); no objection from the standpoint of priority would, however, extend to synonymising the Italian workers' genus with *Entamoeba* Leidy, 1879, the action that he, in fact, meant to take. Despite the fact that Chatton (1910) must be considered as having automatically designated the type species of *Entamoeba* Chatton, 1910 (= *Entamoeba* Leidy, 1879, emended) as *Amoeba blattae* Bütschli, 1878, this should have no effect on the type of *Entamoeba* Casagrandi and Barbagallo, 1895, a genus which was named independently and not as an emendation of Leidy's name "*Entamoeba*" and which Chatton cannot reasonably be regarded as comprehending in his use of the generic name "*Entamoeba*". *Opinion* 164\* (Int. Comm. Zool. Nomencl., 1945a) makes this point clear.

33. The summary of *Opinion* 164 states in part as follows: "When two or more genera are united on taxonomic grounds, such action in no way effects the types of the genera concerned". Thus, even though the type species of *Entamoeba* Chatton, 1910, may be regarded as having been designated, that designation cannot, according to *Opinion* 164, affect the type species of *Entamoeba* Casagrandi and Barbagallo, 1895, which Chatton in effect united with his genus.

34. Although Crawley (1913: 185) listed *Entamoeba histolytica* Schaudinn, 1903, as type species of *Entamoeba*, this cannot be taken as a valid selection of a type species inasmuch as *E. histolytica* was not

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\* Cancelled, except for historical purposes, and its decision incorporated into the *Règles* (see 1950, *Bull. zool. Nomencl.* 4 : 157, 165—166).



an originally included species. It is true that the nominal species *Amoeba coli* L $\ddot{o}$ sch, 1875 [= *E. histolytica*], was placed in *Entamoeba* as originally proposed by Casagrandi and Barbagallo (1895), but the organism so identified by them was in actuality the modern *E. coli*.

35. The first unequivocal selection of a type species for *Entamoeba* Casagrandi and Barbagallo, 1895, was made by Dobell (1919 : 17—18) as follows : “ I shall therefore continue to refer three of the common amoebae of Man—namely *E. coli*, *E. histolytica*, *E. gingivalis*—to the, genus *Entamoeba* Casagrandi and Barbagallo, 1895 ; whilst provisionally I reserve the separate genus *Endamoeba* Leidy, 1879, for the amoeba of the cockroach. On this system, the type species of *Entamoeba* is *E. coli*, and the type of *Endamoeba* is *E. blattae* ”. Dobell specifically stated that the *E. coli* so cited was based on Grassi’s, not on L $\ddot{o}$ sch’s organism. For reasons given in Section VI even his selection encounters technical difficulties.

#### V. The status of the Trivial Names “ *coli* ” of Grassi (1879) and “ *histolytica* ” of Schaudinn (1903).

36. It is desirable at this point to bring up two questions which are only partly related to *Opinion* 99, but are nevertheless of great significance in the nomenclature of amoebae in Man. These questions are respectively the validity of the trivial name *coli* for the large non-dysenteric amoebae of Man and the validity of the trivial name *histolytica* for the amoebae of human amoebic dysentery.

37. It is very important to ensure the status of the trivial name *coli*, inasmuch as it is universally applied today to the large non-dysenteric amoeba of Man, known as *Entamoeba*, or *Endamoeba*, *coli*—the species, moreover, which Dobell has designated as type of *Entamoeba* Casagrandi and Barbagallo, 1895. If this cannot be done under the existing rules, the International Commission must be called upon to exercise their Plenary Powers.

38. As already pointed out in paragraph 8(i), the trivial name *coli* appeared first in the description by L $\ddot{o}$ sch (1875) of organisms from a patient suffering with dysentery ; these unquestionably represented the species now designated *Entamoeba*, or *Endamoeba*, *histolytica*. For detailed historical discussions of the nomenclature of *E. coli* and *E. histolytica* I refer to Dobell (1919) and Stiles and Boeck (1923). It should be remarked, however, that Stiles and Boeck (1923) regarded *Amoeba coli* L $\ddot{o}$ sch, 1875, as representing a mixture of species and contended that Stiles (1892) was the first worker to restrict the name to a single component species—the large non-dysenteric amoeba. On this basis, they found it possible to accept the trivial name *coli* as valid under the rules for that form. However, Dobell (1919) has presented compelling evidence that L $\ddot{o}$ sch (1875) dealt essentially with *E. histolytica*. It seems entirely logical on the basis of L $\ddot{o}$ sch’s usage to regard

*coli* as the correct trivial name for the dysenteric amoeba of Man. However, Dobell ingeniously found it possible to reject Lösch's selection on the basis of its being a vernacular name without nomenclatorial status. Lösch wrote as follows: "Da die von mir beschriebenen Amöbe, so viel mir bewusst, überhaupt mit keiner der bisher bekannten Formen vollkommen übereinstimmt, so scheint es mir gerechtfertigt, dieselbe bis auf Weiteres mit einem besonderen Namen zu bezeichnen und nach ihrem Fundorte etwa *Amoeba coli* zu nennen". Dobell pointed out that Lösch's "*Amoeba coli*" was written in ordinary type, not italicised or spaced; he further stated that "there is nothing to indicate that Lösch did not employ it as a mere descriptive term". In view of the wording of Lösch's sentence this last statement by Dobell is considerably strained. However, the latter offered a rational solution to a vexing nomenclatorial problem, one which no reasonable systematist, lacking a legal means of rectifying the situation, would hesitate to follow if he wished to honour the *Règles* without contravening general usage. The alternative without suspension of existing rules is to substitute *coli* for *histolytica*, a procedure which would today disrupt the firmly established practices of two generations of protozoologists and medical scientists. Since this cannot be done in harmony with the rules and since *coli* is so firmly linked with the large non-dysenteric amoeba, there appears to be involved a clear case where strict application of the *Règles* would result in confusion rather than uniformity. It is therefore important that *coli* be secured for the large non-dysenteric amoeba of Man by the International Commission acting on the Plenary Powers.

39. It would seem quite illogical, however, in securing *coli* to this end for it to be attributed to the authorship of Lösch. Since Grassi (1879) was the first to apply this trivial name to the large non-dysenteric amoeba, it is reasonable to follow Dobell and attribute it to his authorship. On this basis it is necessary to suppress *coli* of Lösch (1875) and validate the otherwise homonymous *coli* of Grassi (1879).

40. It is very important to ensure the status of the trivial name *histolytica* inasmuch as it is universally applied today to the dysenteric amoeba of Man.

41. Though Dobell (1919), as mentioned, reviewed in detail the nomenclatorial history of the dysenteric amoeba of Man, I find it impossible to follow him in all of his conclusions. He discussed four names (aside from *Amoeba coli*) as possibly referring to this species, which antedate *E. histolytica* Schaudinn, 1903—*Amoeba urogenitalis* of Baelz (1883, p. 237), *Amoeba vaginalis* of Blanchard (1885, p. 15), *Amoeba intestinalis* of Blanchard (1885, p. 15) and "amoeba dysenteriae" of Councilman and Lafleur (1891, p. 405). Dobell advanced reasons for rejecting each of these—Baelz's and Blanchard's names as unidentifiable and Councilman and Lafleur's as an obviously vernacular name. I have already pointed out that Dobell cannot be

followed in his rejection of *Amoeba coli* Lösch, 1875, as a systematic name; I believe that the same thing can be said for Councilman and Lafleur's "amoeba dysenteriae". They stated: "We have called the organism, which was first described by Lösch under the name *amoeba coli*, the '*amoeba dysenteriae*'." Inadvertently or through ignorance they merely neglected to capitalize "*amoeba*". In regard to the other names cited by Dobell, I have no essential disagreement with his disposition of them. However, even if his rejection of Councilman and Lafleur's name were followed, the matter could not rest there, as can be seen by the following statement by him (: 28): "Whilst it is true that the terms *A. coli* and *A. dysenteriae* were sometimes used correctly as zoological names, yet they were never used with clear specific conceptions before the time of Schaudinn". The first person to use *Amoeba dysenteriae* as an unquestionably systematic designation was Stiles (1892: 524—525) in a review of Councilman and Lafleur's paper (1891). It is true that Stiles credited this name to the latter authors, but this fact makes it no less available. That this is so is demonstrated in *Opinion 4\** (Int. Comm. Nomencl., 1907, 1944a), the summary of which reads as follows: "Manuscript names acquire standing in nomenclature when printed in connection with the provisions of Article 25, and the question as to their validity is not influenced by the fact whether such names are accepted or rejected by the author responsible for their publication".<sup>4</sup> The discussion by Hemming in the second edition of this *Opinion* (1944a) makes the availability of such a name as *Amoeba dysenteriae* of Stiles (1892) doubly clear.

42. It might seem, therefore, that, if *coli* of Lösch is suppressed as the trivial name for the dysenteric amoeba, *Amoeba dysenteriae* Councilman and Lafleur, 1891 (or Stiles, 1892), would be the next available name. However, Dobell (1919) either did not know about, or ignored, the name *Amoeba dysenterica* used by Pfeiffer (1888: 662) as a new name for *Amoeba coli* of Lösch.† Stiles and Boeck (1923), in

\* To be cancelled, except for historical purposes, and its decision incorporated into the *Règles* (see 1950, *Bull. zool. Nomencl.*, 4: 145—146, 165—166).

† Pfeiffer wrote: "Im Jahr 1875 folgt alsdann die erste ausführliche und genaue Beschreibung von Lösch in St. Petersburg . . . Dessen *Amoeba coli* s. *dysenterica* Lösch hat so viel Aehnlichkeit mit den aus dem Bläscheninhalt von Vaccine, Herpes, Varicella, etc., abgebildeten grossen Zellgebilden dass morphologisch und nach den Bewegungserscheinungen keine Trennung möglich ist". ["In 1875 then follows the first detailed and precise description—by Lösch in St. Petersburg . . . *Amoeba coli* or *dysenterica* Lösch has so much similarity to the large cell structures that have been pictured with the vesicular inclusions of vaccinia, herpes, varicella, etc., that no distinction is possible, either morphologically or on the basis of the appearance of their movements".] In subsequent discussion Pfeiffer referred to Lösch's form as *Amoeba coli* rather than *Amoeba dysenterica*. Lösch did not employ the word "dysenterica" as a trivial name; that name must therefore be credited to Pfeiffer.

<sup>4</sup> The Fourteenth International Congress of Zoology, Copenhagen, 1953, deleted from the *Règles* the portion of the Ruling given in *Opinion 4* which conferred the status of availability upon names published in synonymies without independent descriptions (1953, *Copenhagen Decisions zool. Nomencl.*: 63—64, Decision 115).

accepting Lösch's name as being restricted by Stiles (1892) to the non-dysenteric amoeba, found it possible also to reject *Amoeba dysenterica* Pfeiffer, 1888, and *Amoeba dysenteriae* Councilman and Lafleur, 1891, on the basis that these were renamings of *Amoeba coli* Lösch, 1879, and for that reason had to follow the last name. It is sufficient to point out, since *Amoeba coli* Lösch, 1875, actually applied to the dysenteric species, and on that account alone the other names cited did likewise, Stiles and Boeck's contention is inappropriate. Thus, with the suppression of *coli* of Lösch (1875), *Amoeba dysenterica* Pfeiffer, 1888, is the next unquestionably and validly applied name for the dysenteric amoeba. However, it is impractical to consider substituting *dysenterica* of Pfeiffer (1888) for *histolytica* of Schaudinn (1903). This is clearly a case where strict application of the *Règles* would result in confusion rather than uniformity.<sup>5</sup> The best interests of science will be served by retention of the specific name *Entamoeba histolytica* Schaudinn, 1903 (the next available name for the dysenteric amoeba after *Amoeba dysenterica* Pfeiffer, 1888, and *Amoeba dysenteriae* Councilman and Lafleur, 1891), the trivial name *histolytica* now being universally employed in the zoological and medical fields. In so doing the International Commission must suppress all previous potential or actual synonyms of the trivial name *histolytica*.

43. It is highly important that the International Commission give attention to the names of these important amoebae in Man. A formal recommendation in that connection is made in the final section of this paper.

#### VI. The status of the generic name "Endamoeba" Leidy, 1879, "Entamoeba" Casagrandi and Barbagallo, 1895, and certain others applied to Enteric Amoebae.

44. The genus *Endamoeba* Leidy, 1879, with its type species *Amoeba blattae* Bütschli, 1878, has already been placed on the *Official List of Generic Names in Zoology* in *Opinion 95* (Int. Comm. Zool. Nomencl., 1926). This action is completely supported by the *Règles*.

45. The genus *Entamoeba* Casagrandi and Barbagallo, 1895, has been shown to be independent of *Endamoeba* on an orthographic basis. However, its exact nomenclatorial status has not yet been considered herein. At this point it is necessary to consider the status of *Entamoeba coli* as type species of *Entamoeba*. We have already seen (paragraph 8 (v)) that the Italian workers originally included in their genus the species "*Amoeba coli* (Lösch)" and "*Amoeba blattarum* (Bütschli)" [= *Amoeba blattae* Bütschli]. But the organism called "*Amoeba coli*" by them and later (Casagrandi and Barbagallo, 1897) renamed

<sup>5</sup> The expression "greater confusion than uniformity" here quoted was taken from the Plenary Powers provisions as it then existed. This phrase was deleted, and the scope of the provisions considerably widened, by the Fourteenth International Congress of Zoology, Copenhagen, 1953 (1953, *Copenhagen Decisions zool. Nomencl.* : 22—23, Decision 20).

*Entamoeba hominis* was clearly not the dysenteric amoeba, to which Lösch's name applied, but the large non-dysenteric form. Thus Dobell in selecting *Amoeba coli* as the type species of *Entamoeba* Casagrandi and Barbagallo, 1895, was so doing on the basis of an originally misidentified species. It is true that he corrected the initial error by properly identifying the species that the Italian workers had misidentified. However, the case still requires the attention of the Commission as prescribed in *Opinion 168\** (Int. Comm. Zool. Nomencl. 1945b), the title of which reads "On the principles to be observed in interpreting Article 30 of the International Code in relation to the names of genera based upon erroneously determined species . . ." In the summary it is requested that, where such a case has been discovered, it "should be submitted with full details to the International Commission on Zoological Nomenclature and . . . that, pending their decision thereon, the genus should be regarded as of doubtful status". It may be remarked here that what is true of *Entamoeba* Casagrandi and Barbagallo, 1895, is equally true of *Löschia* Chatton and Lalung-Bonnaire, 1912, for which "*E. coli* Lösch" [= *Amoeba coli* Grassi, 1879] was also designated as the type species.

46. It therefore follows that *Entamoeba* Casagrandi and Barbagallo, 1895 (as also *Löschia* Chatton and Lalung-Bonnaire, 1912), as a genus based on a misidentified type species, is technically of doubtful status. Actually, there is no question of the practical application of either *Entamoeba* or *Endamoeba* to certain enteric amoebae of Man; such is essentially universal. But it is important that the matter be legally clarified.

47. The question may well arise in view of the general confusion in the medical literature over the spelling of the genus used for the dysenteric and large non-dysenteric amoebae of Man, *Entamoeba* being quite general in the United States and *Entamoeba* in Britain, whether there ought to be independent genera *Endamoeba* and *Entamoeba*, which have been accepted as such by Dobell (1938), Kirby (1945), and others. Admittedly the close similarity of the names is regrettable. However, from the practical standpoint, no real difficulty should be encountered, for *Endamoeba blattae* and its congeners, being parasitic in insects, are of no particular consequence to medical scientists. Those zoologists that deal with insect parasites can be expected to be familiar with their nomenclature and are not likely to confuse the two genera; whereas the spelling *Endamoeba* as applied to amoebae in vertebrates may be some time a-dying in the general medical literature, this fact need not disturb scholars concerned with the real genus *Endamoeba*. There does not seem, therefore, to be any real objection to the co-existence of two independent genera with the names *Endamoeba* and *Entamoeba*.

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\* Cancelled, except for historical purposes, and its decision incorporated into the *Règles* (see 1950, *Bull. zool. Nomencl.*, 4 : 158—159, 165—166).

48. The way thus seems well indicated. The International Commission should validate *Entamoeba* Casagrandi and Barbagallo, 1895, a genus based on an originally misidentified species as type species, for which the species *Amoeba coli* Grassi, 1879 (non Lösch, 1875) should be designated, Dobell's selection being thereby validated.

49. Dobell (1938), expressed the conviction that the dysenteric and non-dysenteric amoebae of Man should be placed in separate genera. Although he has not himself done this formally, it would also be well for the International Commission to recognise the generic name that would be used for the dysenteric amoeba in case the proposed separation becomes generally recognised. As mentioned in paragraph 8 (vii), *Poneramoeba* was erected by Lühe (1909) with *Entamoeba histolytica* Schaudinn, 1903, as only species and therefore as type species. As first genus after *Entamoeba* available for the dysenteric amoeba, it would come into use. The International Commission might also permanently sink *Löschia* Chatton and Lalung-Bonnaire, 1912, by validating *Amoeba coli* Grassi, 1879, as its type species, thereby rendering it an objective synonym of *Entamoeba* Casagrandi and Barbagallo, 1895.

50. *Entamoeba* Casagrandi and Barbagallo, 1895, and *Poneramoeba* Lühe, 1909, with their respective type species, should therefore join *Endamoeba* Leidy, 1879, on the *Official List of Generic Names in Zoology*.

## VII. Conclusions and Recommendations.

51. The conclusions and recommendations of the present study are in three categories : those that relate to *Opinion* 99 itself ; those that relate to the trivial names *coli* and *histolytica* ; and those that relate to the generic names *Entamoeba* Casagrandi and Barbagallo, 1895, and *Poneramoeba* Lühe, 1909. The first are covered under paragraph 52 ; the second under paragraphs 53—55 ; and the third under paragraph 56.

52. I feel that it is necessary, and I hereby request, that the International Commission on Zoological Nomenclature should render an *Opinion* in which they first cancel *Opinion* 99 on the ground that the decision set forth therein is incorrect and misleading in certain important respects, and second make the following points, in substitution for those made in the *Opinion* so cancelled :

- (i) The nominal genus *Entamoeba* Casagrandi and Barbagallo, 1895, was established independently of the nominal genus *Endamoeba* Leidy, 1879, the name *Entamoeba* as used by Casagrandi and Barbagallo being neither an accidental misspelling nor an emendation of the name *Endamoeba* as

previously used by Leidy. Under Articles 34 and 36, the names *Endamoeba* and *Entamoeba* are not homonyms of one another.

- (ii) Chatton (1912) did not select a type species for the genus *Entamoeba* Casagrandi and Barbagallo, 1895. In fact, the supposed action of Chatton (1912) on the basis of which type selection was to be inferred according to the *Opinion* actually was originally carried out by Chatton and Lalung-Bonnaire (1912). The genus with which these authors had dealt was *Endamoeba* Leidy, 1879, to which Chatton himself in 1910 had applied the name *Entamoeba* as a tacit emendation of the name *Endamoeba*. Further, even if Chatton and Lalung-Bonnaire (1912) had been dealing with *Entamoeba* Casagrandi and Barbagallo, 1895, instead of with *Entamoeba* Chatton, 1910 (*emend. pro Endamoeba* Leidy, 1879), the action which they then took would not have constituted a valid selection of *Amoeba blattae* Bütschli, 1878, as the type species of that genus, for they did not make a definite type selection under Rule (g) in Article 30, nor did their action constitute such a selection under the special provisions of *Opinion* 6.
- (iii) Brumpt's action in 1913 did not constitute a valid selection of a type species for *Entamoeba* Casagrandi and Barbagallo, 1895, for Brumpt did not comply with the requirements of Rule (g) in Article 30.
- (iv) The first author definitely to select a type species for *Entamoeba* Casagrandi and Barbagallo, 1895, was Dobell (1919), who so selected *Amoeba coli* Grassi, 1879. This selection has been accepted by subsequent authors, but it must be noted that Casagrandi and Barbagallo (1895) did not include this nominal species in the genus *Entamoeba*, the name which they did so include being "*Amoeba coli* (Lösch)", which is the name for a different species, being the dysenteric amoeba of Man now universally known as *Entamoeba histolytica* Schaudinn, 1903. On the other hand, it cannot be doubted that the species which Casagrandi and Barbagallo referred to as "*Amoeba coli* (Lösch)" was the species now universally identified as the large non-dysenteric amoeba of Man, *Amoeba coli* Grassi, 1879. Thus, the genus *Entamoeba* Casagrandi and Barbagallo, 1895, is one based on a mis-identified type species. In these circumstances the Commission acting under the instructions given to it by the International Congress of Zoology as to the action to be taken in any such case where the Commission is satisfied that confusion would result from the strict application of the *Règles*, should hereby use their Plenary Powers to designate *Amoeba coli*

Grassi, 1879, to be the type species of the genus *Entamoeba* Casagrandi and Barbagallo, 1895, thus validating Dobell's selection.

53. It is necessary, if serious confusion is to be avoided, that the trivial names of the large non-dysenteric and the dysenteric amoebae of Man should be placed on an unassailable foundation. The problems arising in connection with the specific names *Amoeba coli* Grassi, 1879, and *Entamoeba histolytica* Schaudinn, 1903, are accordingly summarized in the following paragraphs.

54. Two points arise in connection with the name *Amoeba coli* Grassi, 1879 : (1) whether this is an available name ; and (2) whether it undoubtedly represents the large non-dysenteric amoeba of Man. As regards (1), the name *Amoeba coli* Grassi, 1879, is not an available name because of the prior *Amoeba coli* Lösch, 1875, which applies to the dysenteric amoeba. However, in view of the universal use of *coli* for the non-dysenteric amoeba and the grave confusion which would result if this name had now to be discarded on technical nomenclatorial grounds, I recommend that this particular difficulty should be overcome by the Commission using its Plenary Powers to suppress the trivial name *coli* Lösch, 1875, as published in the binominal combination *Amoeba coli*, and validate the trivial name *coli* Grassi, as published in the binominal combination *Amoeba coli*. As regards (2), there is no reasonable doubt as to the principal species to which Grassi applied the name *coli*, but I recommend that, in order to settle this matter beyond dispute, the Commission should apply in this case the procedure which they adopted in Paris for the purpose of determining the identity of the species to which the trivial name *iris* Linnaeus, 1758, as published in the binominal combination *Papilio iris*, should apply (see 1950, *Bull. zool. Nomencl.* 4 : 359—361)—that is, that the Commission should use its Plenary Powers to direct that the name *coli* Grassi, 1879, as published in the binominal combination *Amoeba coli*, should be the trivial name of the large non-dysenteric amoeba of Man as definitively described and figured by Dobell (1919, pp. 78—92 ; pl. i, figs. 12—15 ; pl. ii, fig. 17 ; pl. iv, fig. 55—69).

55. The name *Entamoeba histolytica* Schaudinn, 1903, is universally applied to the dysenteric amoeba of Man and the greatest confusion would result if it were necessary to change this practice for some technical nomenclatorial reason. On the other hand, there is no doubt that there are at least three older names for this species, namely, *Amoeba coli* Lösch, 1875, *Amoeba dysenterica* Pfeiffer, 1888, and *Amoeba dysenteriae* Councilman and Lafleur, 1891 (or Stiles, 1892). In addition, there are three other names which may have been applied to this species, namely : (1) *Amoeba urogenitalis* Baelz, 1883, (2) *Amoeba vaginalis* Blanchard, 1885, and (3) *Amoeba intestinalis* Blanchard, 1885. Accordingly, in order to provide an unquestionably valid title for the trivial name *histolytica* Schaudinn, 1903, as published



in the binominal combination *Entamoeba histolytica*, I recommend that the Commission, in addition to suppressing the trivial name *coli* Lösch, 1875, as published in the binominal combination *Amoeba coli*, as recommended in paragraph 54 above, should use their Plenary Powers to suppress the under mentioned trivial names and, having done so, should place those names (with *coli* Lösch, 1875) on the *Official Index of Rejected and Invalid Specific Trivial Names in Zoology*: (a) *urogenitalis* Baelz, 1883, as published in the binominal combination *Amoeba urogenitalis*; (b) *vaginalis* Blanchard, 1885, as published in the binominal combination *Amoeba vaginalis*; (c) *intestinalis* Blanchard, 1885, as published in the binominal combination *Amoeba intestinalis*; (d) *dysenterica* Pfeiffer, 1888, as published in the binominal combination *Amoeba dysenterica*; and (e) *dysenteriae* Councilman and Lafleur, 1891 (or Stiles, 1892), as published in the binominal combination *Amoeba dysenteriae*. Finally, as in the case of the trivial name *coli* Grassi, 1879, I recommend that the Commission should use its Plenary Powers definitely to attach the trivial name *histolytica* Schaudinn, 1903, as published in the binominal combination *Entamoeba histolytica*, to the dysenteric amoeba of Man as now recognized by specialists. I recommend that this object should be secured by the Commission directing that the trivial name *histolytica* Schaudinn, 1903, is to be the trivial name for the species as definitively described and figured by Dobell (1919, pp. 31—70; pl. i, figs. 1—6; pl. ii, fig. 16; pl. iii; pl. iv, figs. 70—76).

56. While it is of the first importance that the trivial names of these amoebae should be firmly established, it is also necessary that the generic name *Entamoeba* Casagrandi and Barbagallo, 1895, be stabilized by being placed on the *Official List of Generic Names in Zoology* (type species *Amoeba coli* Grassi, 1879 [syn. *Entamoeba coli* (Grassi, 1879) Schaudinn, 1903], to be validated by the International Commission through the invocation of their Plenary Powers). In view of the fact that such an authority as Dobell felt that generic separation of the dysenteric and large non-dysenteric amoebae of Man will have to be carried out, it would also be well for the International Commission to place *Poneramoeba* Lühe, 1909 (type species *Entamoeba histolytica* Schaudinn, 1903, by original designation), first genus available for the dysenteric amoeba of Man, on the *Official List*. These two generic names would thereby join *Endamoeba* Leidy, 1879 (type species *Amoeba blattae* Bütschli, 1878 [syn. *Endamoeba blattae* (Bütschli, 1878) Leidy, 1879], by monotypy), already placed on the *Official List* under a decision taken in *Opinion* 95. The foregoing actions are hereby recommended.

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3. The third and last of the documents which constitute the application in the present case was a Report by Mr. Francis Hemming, Secretary to the Commission, prepared in response to a request<sup>6</sup> addressed to him by the Commission at its Session held in Paris in 1948. Mr. Hemming's Report, which was based upon the review of the issues involved given in the papers previously submitted by Professor Harold Kirby and Dr. Ellsworth C. Dougherty recommended the cancellation of *Opinion* 99 as incorrect and misleading and contained a series of definite proposals designed to put upon a firm foundation the generic and specific nomenclature of the dysenteric and non-dysenteric amoebae of Man. Immediately upon completing his Report, Mr. Hemming communicated it in draft to Professor Kirby and Dr. Dougherty for observations. On both these specialists intimating that they were in agreement with the proposals set forth in the draft, Mr. Hemming signed the Report for submission to the Commission. Mr. Hemming's Report was as follows :—

**Report on the investigation of the nomenclatorial problems associated with the generic names "Endamoeba" Leidy, 1879, and "Entamoeba" Casagrandi & Barbagallo, 1895 (Class Rhizopoda)**

By FRANCIS HEMMING, C.M.G., C.B.E.

(Secretary to the International Commission on Zoological Nomenclature)

1. The need for a thorough review of the ruling in regard to the status of the generic name *Entamoeba* Casagrandi and Barbagallo, 1895 (Class Rhizopoda) in relation to the name *Endamoeba* Leidy, 1879, dealt with in the *Opinion* previously rendered by the International

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<sup>6</sup> For a fuller reference to the request here referred to see paragraph 6 of the present *Opinion*.

Commission on Zoological Nomenclature as *Opinion* 99, was first formally brought to the attention of the Commission in January, 1945, when Professor Harold Kirby (University of California, Berkeley, California, U.S.A.) submitted a paper entitled “*Entamoeba coli* versus *Endamoeba coli*”, in which he drew attention to what appeared to be a serious error in that *Opinion*.

2. Owing to wartime difficulties, it was not possible at that time at once to publish Professor Kirby's paper in the *Bulletin of Zoological Nomenclature* and it was accordingly arranged that, in order to draw the attention of interested protozoologists to the nomenclatorial issues involved, Professor Kirby's paper should (as already contemplated) be published as soon as possible in the *Journal of Parasitology* and that it should be republished in the *Bulletin of Zoological Nomenclature* as soon as it was possible to submit this case to the International Commission for consideration. Not long afterwards, Professor Kirby's paper duly appeared (June, 1945, *J. Parasit.* 31 : 177—184). At my suggestion, Professor Kirby added a footnote in which he explained that the problem dealt with in that paper had been submitted to the International Commission for decision and invited any specialist who might wish to comment on the conclusions reached in that paper to send those comments direct to myself, as Secretary to the Commission.

3. In July, 1946, Dr. Ellsworth C. Dougherty (University of California, Berkeley, California, U.S.A.) submitted to the Commission a paper in which he accepted the conclusions reached by Professor Kirby and brought forward additional matters which appeared to call for consideration.

4. *Notice given in 1947 of the possible use of the Plenary Powers in the present case* : Notice of the possible use of the Plenary Powers in this case was given on November 1947 to the journals *Science and Nature* and was published shortly thereafter. This notice, like the footnote attached to Professor Kirby's paper of 1945, failed to elicit any objections. Thus, by the time that the International Commission met in Paris in July, 1948, there were strong grounds for believing that a revision of *Opinion* 99 on the lines suggested would be in accordance with the general wishes of protozoologists.

5. *Preliminary action taken by the International Commission in Paris in 1948* : The attention of the International Commission was drawn to this question during its Session held in Paris in 1948 in Commission Paper I.C. (48) 17 (1950, *Bull. zool. Nomencl.* 3 : 128), which was considered by the Commission at its Twelfth Meeting during that Session (Paris Sessions, 12th Meeting, Conclusion 22 (4)) (1950, *Bull. zool. Nomencl.* 4 : 338). The Commission then recommended—and the Congress agreed—that the decision in *Opinion* 99 (unlike the decisions in other *Opinions*) should not be recorded in the Schedule

to the *Règles* then established for the recording of such decisions, until after the subject matter of that *Opinion* had been thoroughly reviewed and that, pending the outcome of that review, the question dealt with in *Opinion* 99 were to be regarded as being *sub judice*.

6. *Review of the decision given in "Opinion" 99*: Since the Paris Congress Dr. Dougherty has thoroughly reviewed both the literature of the amoebae of Man dealt with in the present Report and the conclusions in regard to the names published for those species (both at the genus level and at the species level) given in *Opinion* 99. This investigation has confirmed the conclusions which he and Professor Kirby had previously reached and has brought to light certain other supplementary matters which will also need to be dealt with before the nomenclature of these species can be placed on a sound legal footing. Dr. Dougherty has accordingly revised his earlier paper to take account of these additional considerations. At the same time he has drafted the concluding recommendations, so as to secure that they deal with all the matters (relating to the placing on *Official Lists* and *Official Indexes* of names dealt with in *Opinions*) which the Paris Congress decided should in future be dealt with in cases of this kind.

7. *Close parallel between the history of the names published for the amoebae of Man and that of the names published for the malaria parasites of Man*: The data submitted by Professor Kirby and Dr. Dougherty amply justify the decision taken by the Commission in Paris to review the ruling given in *Opinion* 99, for they disclose a tissue of errors and misconceptions in that *Opinion*. The history of the names published for the amoebae of Man, as set forth in the documents now submitted, shows a remarkable similarity with the history of the names published for the malaria parasites of Man; in each case, the universal practice of protozoologists for the last half-century has been totally at variance with the provisions of the *Règles*; in each case, it was Schaudinn who was principally responsible for the nomenclatorial errors which have become so deeply embedded in protozoological and medical literature; in each case, the Commission attempted (in the case of the names of the amoebae of Man, in *Opinion* 99; in the case of the malaria parasites of Man, in *Opinion* 104) to reach a settlement without recourse to the Plenary Powers, the only difference in this regard between these two cases being that in the latter case the Commission sought to give valid force to the current practice of protozoologists, while in the former it did not.

8. *Action recommended*: During its Paris Session the International Commission corrected the errors previously made in regard to the names of the malaria parasites of Man (see 1950, *Bull. zool. Nomencl.* 4: 594—624) and it is clearly desirable that a corresponding correction of the errors made in regard to the names of the dysenteric and non-dysenteric amoebae of Man should now be made as quickly as possible, in the light of the data submitted by Professor Kirby and Dr. Dougherty,

the object of the action so taken being to give valid force to the current nomenclatorial practice of protozoologists and to avoid the appalling confusion which would result from any attempt strictly to apply the *Règles* to those names. In order to correct the errors in *Opinion* 99 and to deal fully with the associated nomenclatorial problems (as was done when a corresponding correction was made of errors in regard to the names of the malaria parasites of Man), it would be necessary for the International Commission to take—and I recommend that it should take—action on the following lines :—

(1) cancel *Opinion* 99 as incorrect and misleading ;

(2) use its Plenary Powers :—

(a) to suppress :—

(i) for the purposes both of the Law of Priority and also of the Law of Homonymy, the trivial name *coli* Lösch, 1875, as published in the binominal combination *Amoeba coli* ;

(ii) for the purposes of the Law of Priority but not for those of the Law of Homonymy, the under-mentioned trivial names :—

(a) *urogenitalis* Baelz, 1883, as published in the binominal combination *Amoeba urogenitalis* ;

(β) *vaginalis* Blanchard, 1885, as published in the binominal combination *Amoeba vaginalis* ;

(γ) *intestinalis* Blanchard, 1885, as published in the binominal combination *Amoeba intestinalis* ;

(δ) *dysenterica* Pfeiffer, 1888, as published in the binominal combination *Amoeba dysenterica* ;

(ε) *dysenteriae* Councilman and Lafleur, 1891, as published in the binominal combination *Amoeba dysenteriae* ;

(b) to direct that the trivial name *histolytica* Schaudinn, 1903, as published in the binominal combination *Entamoeba histolytica*, is to be applied to the large dysenteric amoeba of Man described and figured by Dobell (C.C.), 1919, *The Amoebae living in Man* : 31—70, Pl. I, figs. 1—6 ; pl. II, fig. 16 ; Pl. III ; Pl. IV, figs. 70—76 ;



- (c) to direct that the specific name *Amoeba coli*, as published by Grassi in 1879, is to be treated as being a specific name then published for the first time and to validate the trivial name so published ;
- (d) to direct that the trivial name *coli* Grassi, 1879, as published in the binominal combination *Amoeba coli*, as validated in (c) above, is to be applied to the large non-dysenteric amoeba of Man described and figured by Dobell (C.C.), 1919, *loc. cit.* : 78—92, Pl. I, figs. 12—15; Pl. II, fig. 17 ; Pl. IV, fig. 55—69 ;
- (e) to designate *Amoeba coli* Grassi, 1879, as validated under (c) above and as defined in (d) above, as the type species of the genus *Entamoeba* Casagrandi and Barbagallo, 1895 (a genus based upon a misidentified type species) ;
- (f) to direct that *Amoeba coli* Grassi, 1879, validated and defined as in (e) above, is to be accepted as the type species by original designation of *Löschia* Chatton and Lalung-Bonnaire, 1912 (a genus based upon a misidentified type species) ;
- (3) to declare that the name *Entamoeba* Casagrandi & Barbagallo, 1895, is not a homonym of the name *Endamoeba* Leidy, 1879 ;
- (4) to place the under-mentioned generic names on the *Official List of Generic Names in Zoology* :—
- (a) *Entamoeba* Casagrandi & Barbagallo, 1895 (type species by designation under the Plenary Powers, under (2) (e) above : *Amoeba coli* Grassi, 1879, as validated and defined under (2) (c) and (2) (d) above respectively) (gender of generic name : feminine) ;
- (b) *Poneramoeba* Lühe, 1909 (type species, by original designation : *Entamoeba histolytica* Schaudinn, 1903) (gender of generic name : feminine) (for use by workers who consider *Entamoeba histolytica* Schaudinn, 1903, to be generically distinct from *Amoeba coli* Grassi, the type species of *Entamoeba* Casagrandi & Barbagallo, 1895) ;
- (5) to confirm the position on the *Official List of Generic Names in Zoology* of *Endamoeba* Leidy, 1879 (type species, by monotypy : *Amoeba blattae* Bütschli, 1878) (gender of generic name : feminine) ;

- (6) to place the generic name *Löschia* Chatton & Lalung-Bonnaire, 1912 (type species, by designation under the Plenary Powers under (2) (f) above : *Amoeba coli* Grassi, 1879 (a junior objective synonym of *Entamoeba* Casagrandi & Barbagallo, 1895)) on the *Official Index of Rejected and Invalid Generic Names in Zoology* ;
- (7) to place the under-mentioned specific trivial names on the *Official List of Specific Trivial Names in Zoology* ;
- (a) *blattae* Bütschli, 1878, as published in the binominal combination *Amoeba blattae* (type species of *Endamoeba* Leidy, 1879) ;
- (b) *coli* Grassi, 1879, as published in the binominal combination *Amoeba coli* (as validated and defined under the Plenary Powers under (2) (c) and (2) (d) above respectively) (type species of *Entamoeba* Casagrandi & Barbagallo, 1895) ;
- (c) *histolytica* Schaudinn, 1903, as published in the binominal combination *Entamoeba histolytica* (as defined under the Plenary Powers under (2) (b) above) (type species of *Poneramoeba* Lühe, 1909) ;
- (8) to place the under-mentioned trivial names on the *Official Index of Rejected and Invalid Specific Trivial Names in Zoology* ;
- (a) *coli* Lösch, 1875, as published in the binominal combination *Amoeba coli*, as suppressed under the Plenary Powers under (2) (a) (i) above) ;
- (b) the under-mentioned trivial names suppressed under the Plenary Powers under (2) (a) (ii) above :—
- (a) *urogenitalis* Baelz, 1883, as published in the binominal combination *Amoeba urogenitalis* ;
- (β) *vaginalis* Blanchard, 1885, as published in the combination *Amoeba vaginalis* ;
- (γ) *intestinalis* Blanchard, 1885, as published in the binominal combination *Amoeba intestinalis* ;
- (δ) *dysenterica* Pfeiffer, 1888, as published in the binominal combination *Amoeba dysenterica* ;
- (ε) *dysenteriae* Councilman & Lafleur, 1891, as published in the binominal combination *Amoeba dysenteriae*.

9. Before signing the present Report, I submitted it in draft for comment to Professor Harold Kirby and Dr. Ellsworth C. Dougherty, the two specialists who had communicated with the Commission on this subject. Both have since informed me that they concur in the solution suggested.

## II.—THE SUBSEQUENT HISTORY OF THE CASE

4. **Registration of the present application :** Immediately upon the receipt of Professor Kirby's preliminary communication of January 1945, the problem of the revision of *Opinion 99* and, in particular, the question of the status to be accorded to the name *Entamoeba Casagrandi* & Barbagallo, 1895, was allotted the Registered Number Z.N.(S.) 185.

5. **Discussions during the period 1945—1948 :** As has been explained in Section I of the present *Opinion*, difficulties arising from paper rationing, shortage of labour at the printing works and similar causes made it impossible in 1945 for the Commission to arrange for the immediate publication in the *Bulletin of Zoological Nomenclature* of Professor Kirby's paper, but the addition then made to that paper, as then published in the *Journal of Parasitology*, of an appeal to interested specialists to furnish the Commission with statements of their views gave Public Notice that the question of the revision of *Opinion 99* was under consideration. On 20th November 1947, this was supplemented by the formal issue of Public Notice of the possible use of the Commission's Plenary Powers in the present case to the serial publications prescribed by the Ninth International Congress of Zoology, Monaco, 1913. Neither the appeal published in 1945 with Professor Kirby's paper nor the formal issue of Public Notice in 1947 elicited any objection to the suggested revision of *Opinion 99*.

6. **Submission to the Commission in 1948 of a proposal that the problems raised by the Ruling given in "Opinion" 99 should be brought under review :** When the International Commission met

in Paris in 1948, Mr. Hemming, as Secretary, took the view that the issues involved in the proposal that the Ruling given in *Opinion 99* should be brought under review were so complex that it was desirable that this matter should be deferred until it was possible to publish in the *Bulletin of Zoological Nomenclature* the paper received from Professor Kirby in 1945 and the application submitted by Dr. Ellsworth C. Dougherty in the following year. Mr. Hemming decided therefore not to bring forward the present case at that Session. In view, however, of the fact that the Commission was then engaged in making arrangements for the codification of the Rulings given in its earlier *Opinions*, Mr. Hemming considered it desirable in this and certain other cases to suggest that the codification of the Rulings previously given should be deferred. Accordingly, in a paper (Paper I.C.(48)17) then laid before the Commission, Mr. Hemming submitted the following recommendation (Hemming, 1950, *Bull. zool. Nomencl.* 3 : 127—128) :—

(90) *Supplementary decisions needed in regard to matters dealt with in certain " Opinions " before the contents of those " Opinions " can usefully be inserted in Schedules to the " Règles " :—*

. . . . .

- (d) *Opinion 78* Name of the Rocky Mountain Spotted Fever Tick  
and
- (e) *Opinion 99* *Endamoeba* and *Entamoeba*

Both these *Opinions* are very poor, have been the subject of much criticism, and have been re-submitted by specialists for further consideration. It is accordingly proposed :—

- (a) that the Commission should announce that the matters dealt with in these two *Opinions* should be treated as being *sub judice* ; and
- (b) that, pending a review of the problems involved, the contents of neither of these *Opinions* should be entered in the Fourth Schedule to the *Règles*.

. . . . .

**7. Decision taken by the International Commission in 1948 as to the procedure to be adopted in the matter of the review of**

“ **Opinion** ” 99 : The problem raised by the objections which had been received in regard to the Ruling given in *Opinion* 99 was considered by the International Commission on Zoological Nomenclature at the Twelfth Meeting of its Paris Session held at the Sorbonne in the Amphithéâtre Louis-Liard on Monday, 26th July 1948, at 1445 hours. The following is an extract from the Official Record of the Proceedings of the International Commission, setting out the decision then reached in regard to the present case (1950, *Bull. zool. Nomencl.* 4 : 337—338) :—

THE COMMISSION agreed :—

- (4) as regards *Opinion* 78 (“ Case of *Dermacenter andersoni* versus *Dermacenter venustus*”) and *Opinion* 99 (“ *Endamoeba* Leidy, 1879, versus *Entamoeba* Casagrandi and Barbagallo, 1895”) :—
- (a) that the decisions given in the foregoing *Opinions* should be reviewed by the Commission as soon as possible ;
  - (b) that, pending the conclusion of the review referred to in (a) above, the decisions recorded in the foregoing *Opinions* should not be incorporated in the Schedules to the *Règles* ;
  - (c) that a statement should be issued announcing the decisions recorded in (a) and (b) above, stating that, pending the completion of the review specified in (a) above, the matters dealt with respectively in *Opinion* 78 and *Opinion* 99 are to be treated as being *sub judice* and inviting specialists to communicate to the Commission their views on the action to be taken by way of confirming, modifying or reversing the decisions recorded in those *Opinions*.

**8. Revision in 1950 by Dr. Ellsworth C. Dougherty of his application for the review of the Ruling given in "Opinion" 99 :** Immediately after the close of the Thirteenth International Congress of Zoology, Dr. Ellsworth C. Dougherty visited London and on 6th August 1948 called at the Secretariat of the Commission for the purpose of discussing with Mr. Hemming the problems involved in the suggested revision of *Opinion* 99. It was then agreed that certain revisions of Dr. Dougherty's application of 1946 were required, in order, for example, to take account of the decisions by the Paris Congress to establish an *Official List of Specific Names in Zoology* (then styled the *Official List of Specific Trivial Names in Zoology*) and *Official Indexes of Rejected and Invalid Names* (both generic and specific). Dr. Dougherty's application so revised was received in the Spring of 1950. It forms the second of the three documents which collectively constitute the documentation submitted to the Commission in the matter of the revision of *Opinion* 99. It has been reproduced in paragraph 2 of the present *Opinion*.

**9. Submission of the Report called for in 1948 :** In pursuance of the decision taken by the International Commission at its Paris Session (paragraph 7 above), Mr. Hemming, as Secretary, carried out in 1950 a review of the available material relating to the problems involved in the Ruling given in *Opinion* 99, and in the light of that review prepared a Report, with recommendations, for the consideration of the Commission. This Report, the recommendations in which were agreed in draft between Mr. Hemming, Professor Kirby and Dr. Dougherty, forms the third and concluding portion of the documentation relating to the present case. It has been reproduced in paragraph 3 of the present *Opinion*.

**10. Publication of the documentation relating to the review of the Ruling given in "Opinion" 99 :** The three documents which constitute the documentation relating to the proposed review of the Ruling given in *Opinion* 99 were sent to the printer in December 1950 and were published on 15th August 1951 in Double-Part 9/10 of volume 2 of the *Bulletin of Zoological Nomenclature* (Kirby, 1951, *Bull. zool. Nomencl.* 2 : 243—252 ; Dougherty, 1951, *ibid.* 2 : 253—276 ; Hemming, 1951, *ibid.* 2 : 277—281).

**11. Issue of Public Notices :** Under the revised arrangements approved by the Thirteenth International Congress of Zoology, Paris, 1948 (1950, *Bull. zool. Nomencl.* 4 : 51—56), Public Notice of the possible use by the International Commission on Zoological Nomenclature of its Plenary Powers in the present case was given on 15th August 1951, both in Double-Part 9/10 of volume 2 of the *Bulletin of Zoological Nomenclature*, the Part in which the three papers which collectively constitute the application in the present case were published, and to the other prescribed serial publications. In addition, Public Notice was given to certain other zoological and specialist serial publications. The publication of these Notices elicited only the comment reproduced in the immediately following paragraph.

**12. Comment received from Dr. G. F. Otto (The Johns Hopkins University, School of Hygiene and Public Health, Department of Parasitology, Baltimore, Maryland, U.S.A.) :** On 21st December 1951 Dr. G. F. Otto (*The Johns Hopkins University, School of Hygiene and Public Health, Department of Parasitology, Baltimore, Maryland, U.S.A.*) submitted the following letter commenting upon the proposals submitted for the revision of *Opinion* 99 :—

I am rather belatedly writing to you concerning the announcement in the October 26 issue of *Science* to the effect that the International Commission will reconsider the question of the generic name of *E. histolytica*<sup>7</sup>. I should like to call attention to the fact that it seems to me that the earlier decision of the Commission as written by the late Dr. Charles W. Stiles, who was then the Secretary, transcended the authority of the Commission. In effect, the decision said that *histolytica* and *coli* of Man are in the same genus with *blattae* of the cockroach. It does not seem to me that the Commission has any such authority. All it could have done was to have said that, if those are in the same genus, then the spelling *Entamoeba* would be the correct generic name. Accordingly, it seems to me that that would be the appropriate decision for the present Commission but that the Commission should go further and say that, if they are not in the same genus, then *Entamoeba* is the correct spelling for *histolytica* and *coli* of Man. If the cockroach and the two forms mentioned from Man are in

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<sup>7</sup> As it was evident from this passage that Dr. Otto had seen only the abbreviated notice published in *Science*, the Secretary, in replying (on 13th February, 1952) drew his attention to the detailed proposals which had been published in the *Bulletin of Zoological Nomenclature*.

separate genera and *Entamoeba* is not to be retained for the amoeba of Man, then one of the other names such as *Poneramoeba*, not *Endamoeba* would be the correct name. It is perhaps unfortunate that the two spellings *Entamoeba* and *Endamoeba* are so similar, but one does not resolve the matter by attempting to suppress one genus which is in effect what the earlier ruling of the Commission has done.

I am writing to you in this vein because it is not absolutely clear to me what the current recommendation of the Commission is. I gather that you are proposing to establish *Entamoeba* as a generic name for the organisms of Man and to this I wholly subscribe. On the other hand, since you use the statement "action designated to validate existing practices", I might call you attention to the fact that existing practice in American medical literature is to use *Endamoeba* and that it is thoroughly entrenched. It is for that reason that I take the liberty of writing you since there is possible ambiguity in your phraseology. I grant that in most scientific circles in America and abroad *Entamoeba* is accepted as correct but it is not universally accepted.

### III.—THE DECISION OF THE INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE

**13. Issue of Voting Paper V.P.(52)32 :** On 9th May 1952, a Voting Paper V.P.(52)32) was issued in which the Members of the Commission were invited to vote either for, or against the proposal "relating to the name *Entamoeba* Casagrandi & Barbagallo, 1895, and associated problems, as specified in Points (1) to (8) in paragraph 8 on pages 279 to 281 of volume 2 of the *Bulletin of Zoological Nomenclature*" [*i.e.*, in paragraph 8 of the Secretary's Report reproduced in paragraph 3 of the present *Opinion*].

**14. The prescribed Voting Period :** As the foregoing Voting Paper was issued under the Three-Month Rule, the prescribed Voting Period closed on 9th August 1952.



**15. Particulars of the Voting on Voting Paper V.P.(52)32 :** The state of the voting on Voting Paper V.P.(52)32 at the close of the prescribed Voting Period was as follows :—

(a) *Affirmative Votes had been given by the following sixteen (16) Commissioners (arranged in the order in which Votes were received) :*

Hering ; Riley ; Dymond ; Calman ; Hankó ; Bonnet ; Vokes ; do Amaral ; Boschma ; Pearson<sup>8</sup> ; Hemming ; Bradley ; Esaki ; Lemche ; Stoll ; Cabrera ;

(b) *Negative Votes :*

None ;

(c) *Voting Papers not returned two (2) :*

Jaczewski ; Mertens.

**16. Declaration of Result of Vote :** On 10th August 1952, Mr. Hemming, Secretary to the International Commission, acting as Returning Officer for the Vote taken on Voting Paper V.P.(52)32, signed a Certificate that the Votes cast were as set out in paragraph 15 above and declaring that the proposal submitted in the foregoing Voting Paper had been duly adopted and that the decision so taken was the decision of the International Commission in the matter aforesaid.

**17.** On 25th March 1954 Mr. Hemming prepared the Ruling given in the present *Opinion* and at the same time signed a Certificate that the terms of that Ruling were in complete accord with those of the proposal approved by the International Commission in its Vote on Voting Paper V.P.(52)32.

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<sup>8</sup> Commissioner Pearson exercised in this case the right conferred by the Thirteenth International Congress of Zoology, Paris, 1948, under which a Commissioner may, if he so desires, signify his willingness to support the view, or the majority view, of other members of the Commission (1950, *Bull. zool. Nomencl.*, 4 : 50—51).

**18. Original References :** The following are the original references for the names placed or confirmed on *Official Lists* and placed on *Official Indexes* by the Ruling given in the present *Opinion* :—

- blattae*, *Endamoeba*, Leidy, 1878, *Z. wiss. Zool.* **30** (2) : 273—277  
*coli*, *Amoeba*, Lösch, 1875, *Virchows Arch. path. Anat.* **65** [6s, 5] (2) : 208 pl. 10 figs. 1—3  
*coli*, *Amoeba*, Grassi, 1879, *Gazz. med. lombarda* **39** [8s. 1] (45) : 445  
*dysenteriae*, *Amoeba*, Councilman & Lafleur, 1891, *Johns Hopkins Hosp. Rep.* **2** (7/9) : 405  
*dysenterica*, *Amoeba*, Pfeiffer, 1888, *Corresp. Bl. allgem. ärztl. Ver. Thüringen* **17** (11) : 662  
*Endamoeba* Leidy, 1879, *Proc. Acad. nat. Sci. Philad.* **1879** : 205  
*Entamoeba* Casagrandi & Barbagallo, 1895, *Boll. Acad. Gioenia Sci. nat. Catania* (n.s.) **1895** (41) : 18  
*histolytica*, *Entamoeba*, Schaudinn, 1903, *Arb. Gesundheitsamt. Berlin* **19** (3) : 564  
*intestinalis*, *Amoeba*, Blanchard, 1885, *Traité Zool. médic.* **1** : 15  
*Löschia* Chatton & Lalung-Bonnaire, 1912, *Bull. Soc. Path. exot.* **5** (2) : 142  
*Poneramoeba* Lühe, 1909, *Schr. phys.-ökon. Ges. Königsb.* **49** : 421  
*urogenitalis*, *Amoeba*, Baelz, 1883, *Berl. klin. Wschr.* **20** (16) : 237  
*vaginalis*, *Amoeba*, Blanchard, 1885, *Traité Zool. médic.* **1** : 15

**19.** The application dealt with in the present *Opinion* was published in the *Bulletin of Zoological Nomenclature* prior to the establishment of the *Official List of Family-Group Names in Zoology* by the Fourteenth International Congress of Zoology, Copenhagen, 1953. It has not been possible since then to deal with this aspect of the present case. This question is, however, now being examined on a separate File to which the Registered Number Z.N.(G.) 75 has been allotted.

**20.** At the time of the adoption of the Ruling given in the present *Opinion*, the expression prescribed for the second portion of the binomen which constitutes the scientific name of a species was the expression “trivial name” and the *Official List* reserved for recording such names was styled the *Official List of Specific*

*Trivial Names in Zoology*, the word "trivial" appearing also in the title of the *Official Index* reserved for recording rejected and invalid names of this category. Under a decision taken by the Fourteenth International Congress of Zoology, Copenhagen, 1953, the expression "specific name" was substituted for the expression "trivial name" and corresponding changes were made in the titles of the *Official List* and *Official Index* of such names (1953, *Copenhagen Decisions zool. Nomencl.* : 21). The changes in terminology so adopted have been incorporated in the Ruling given in the present *Opinion*.

21. The prescribed procedures were duly complied with by the International Commission on Zoological Nomenclature in dealing with the present case, and the present *Opinion* is accordingly hereby rendered in the name of the said International Commission by the under-signed Francis Hemming, Secretary to the International Commission on Zoological Nomenclature, in virtue of all and every the powers conferred upon him in that behalf.

22. The present *Opinion* shall be known as *Opinion* Three Hundred and Twelve (312) of the International Commission on Zoological Nomenclature.

DONE in London, this Twenty-Fifth day of March, Nineteen Hundred and Fifty-Four.

*Secretary to the International Commission  
on Zoological Nomenclature*

FRANCIS HEMMING

